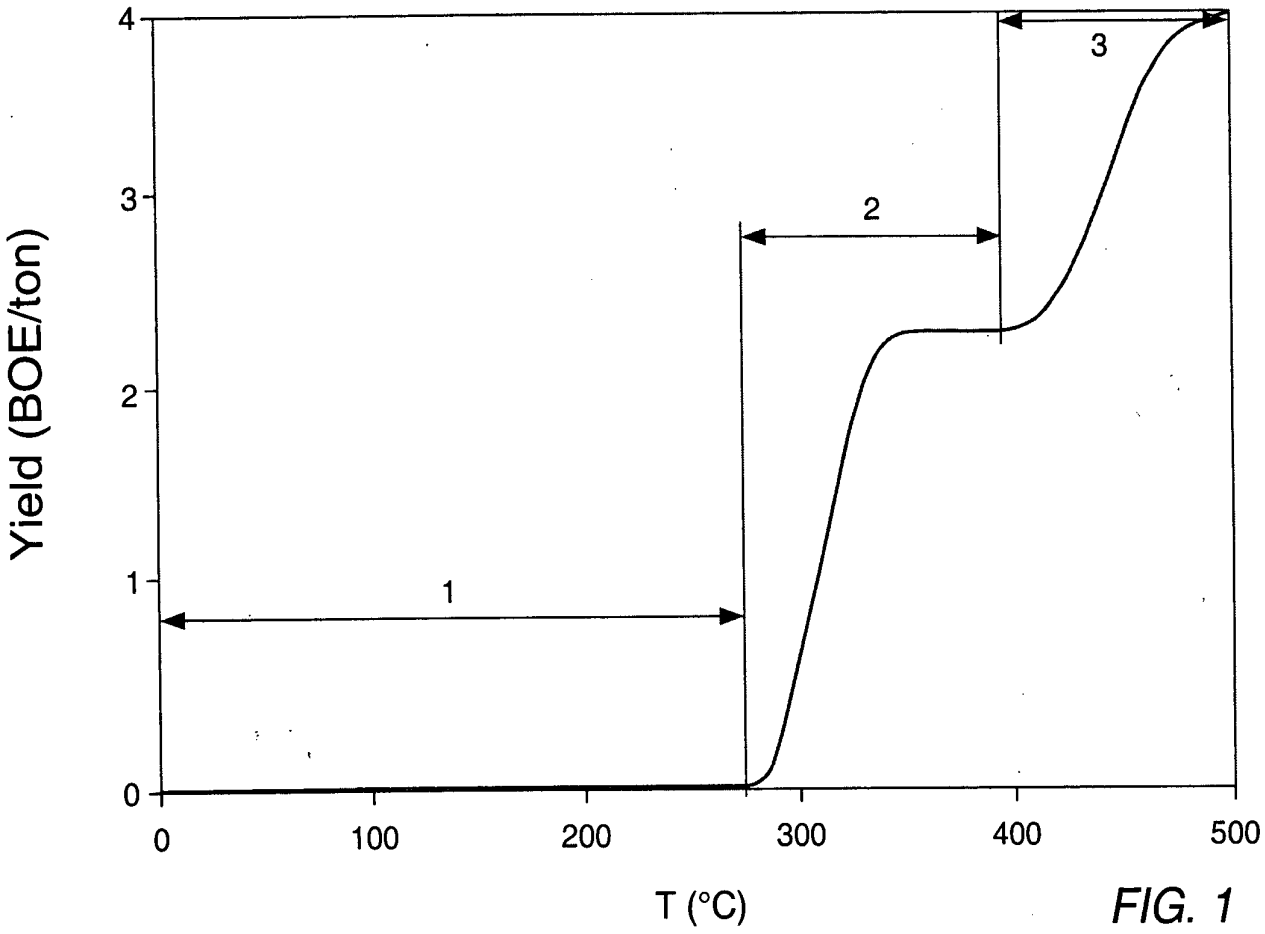
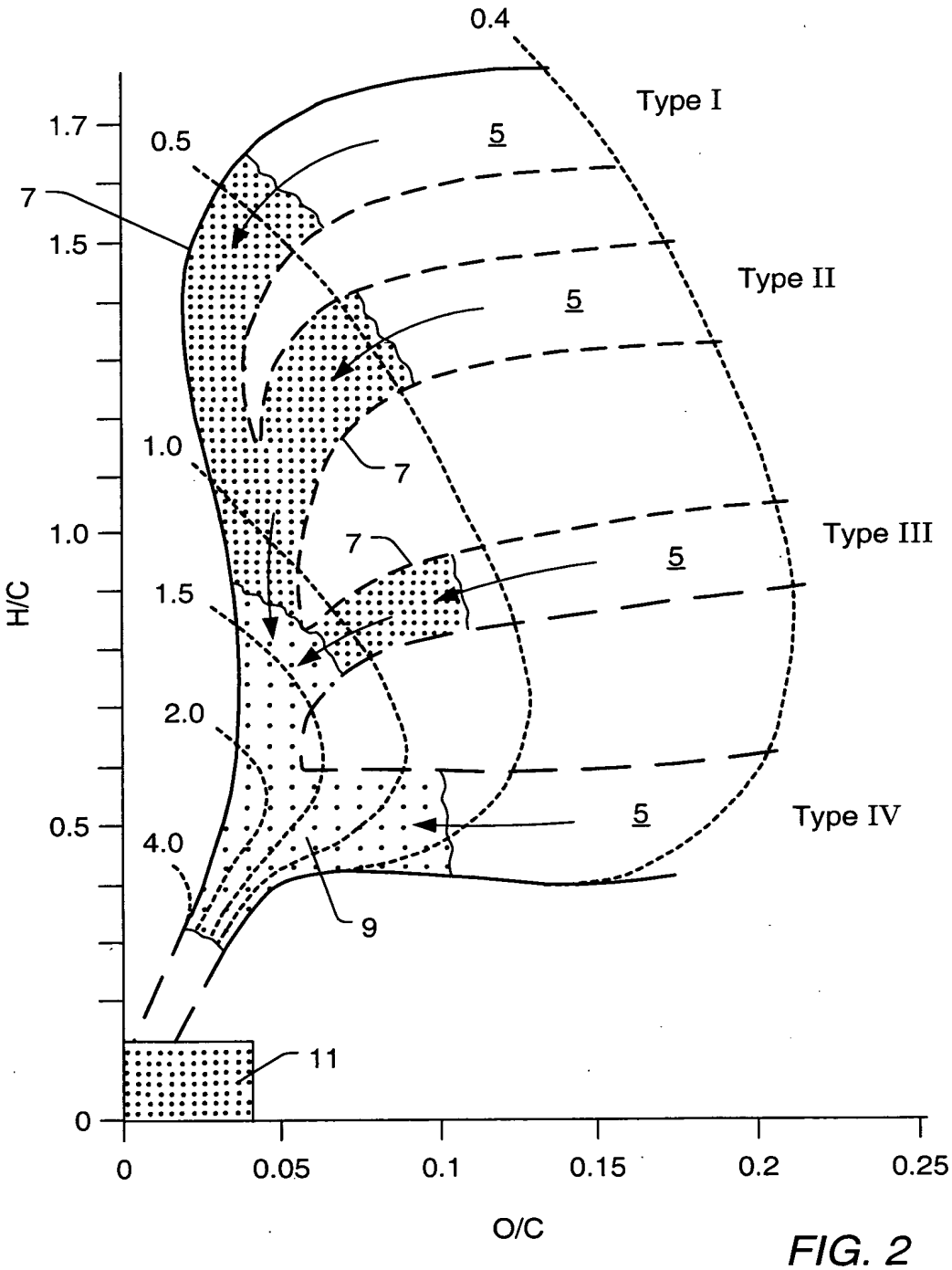


FIG. 1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Type II
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1.0
7
Type III
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H/C
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Type IV
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0.1
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0.25
O/C

FIG. 2

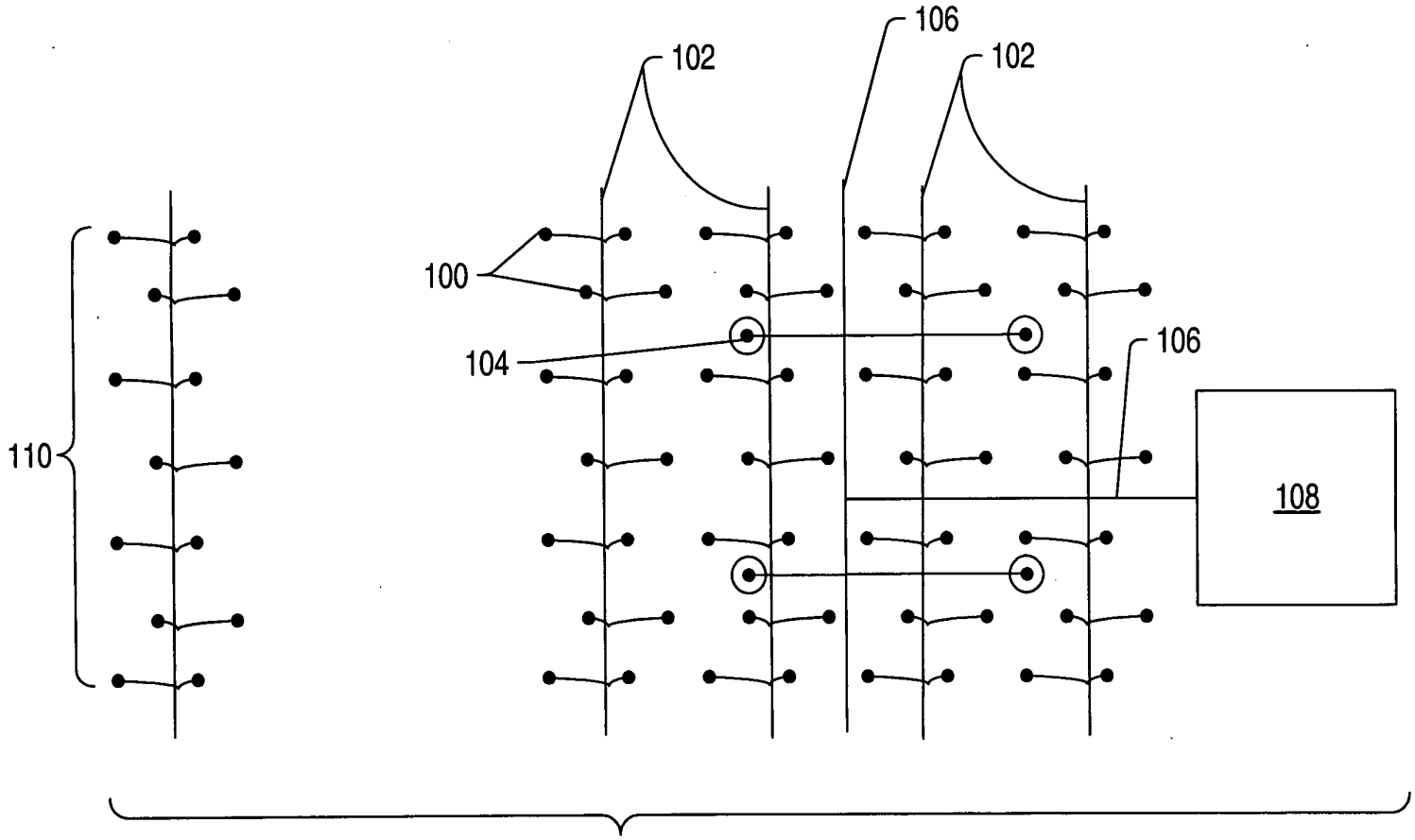

FIG. 3

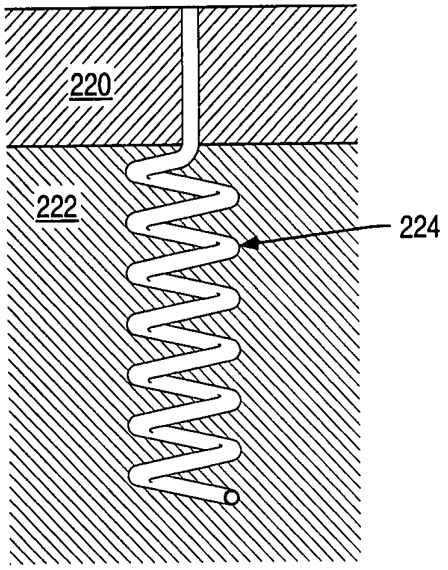

FIG. 3a

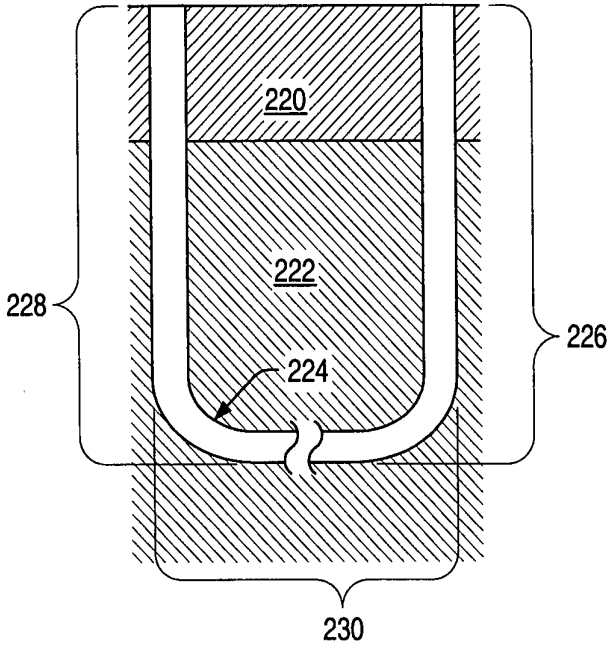

FIG. 3b

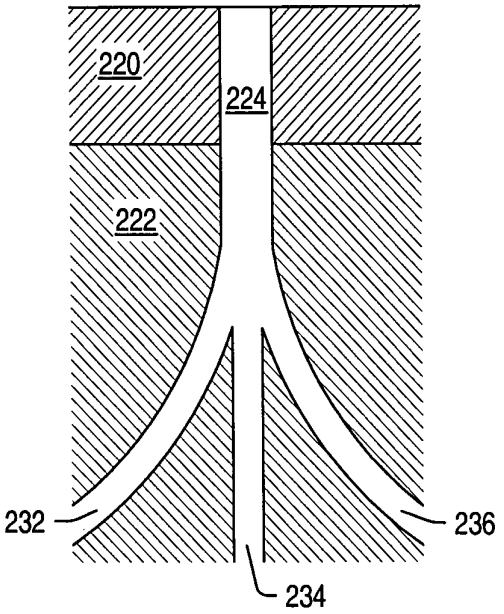

FIG. 3c

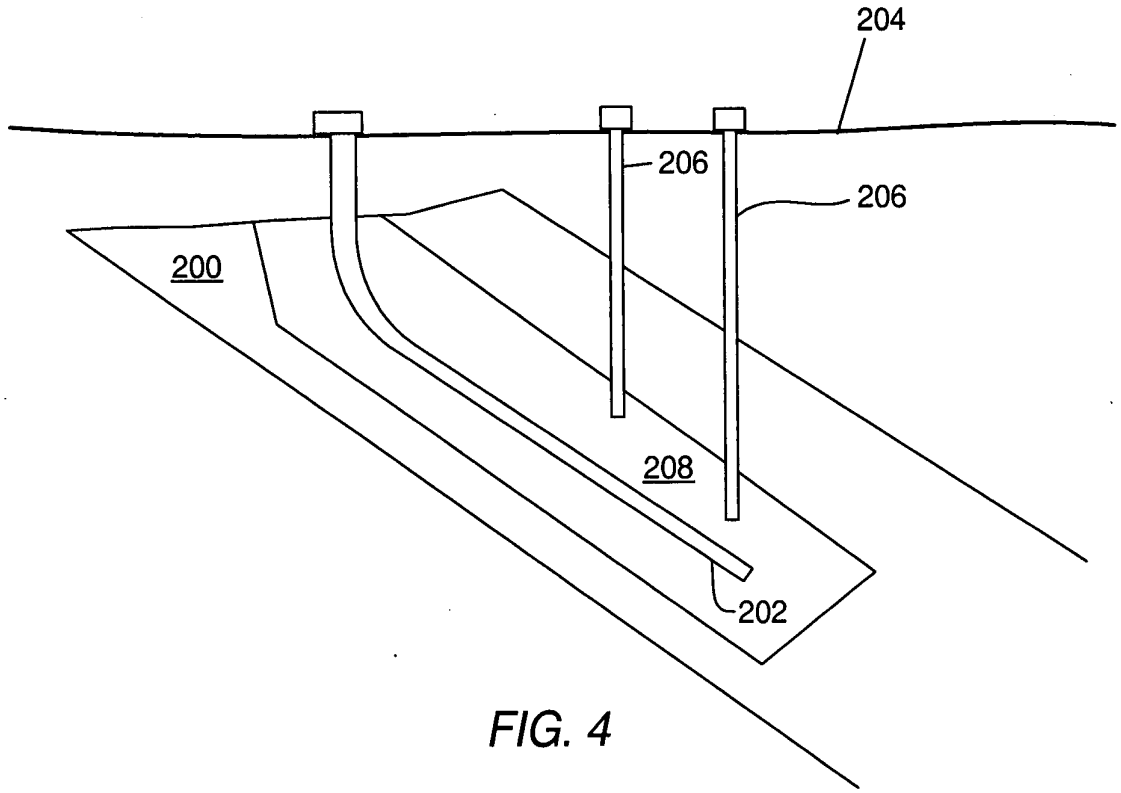

FIG. 4

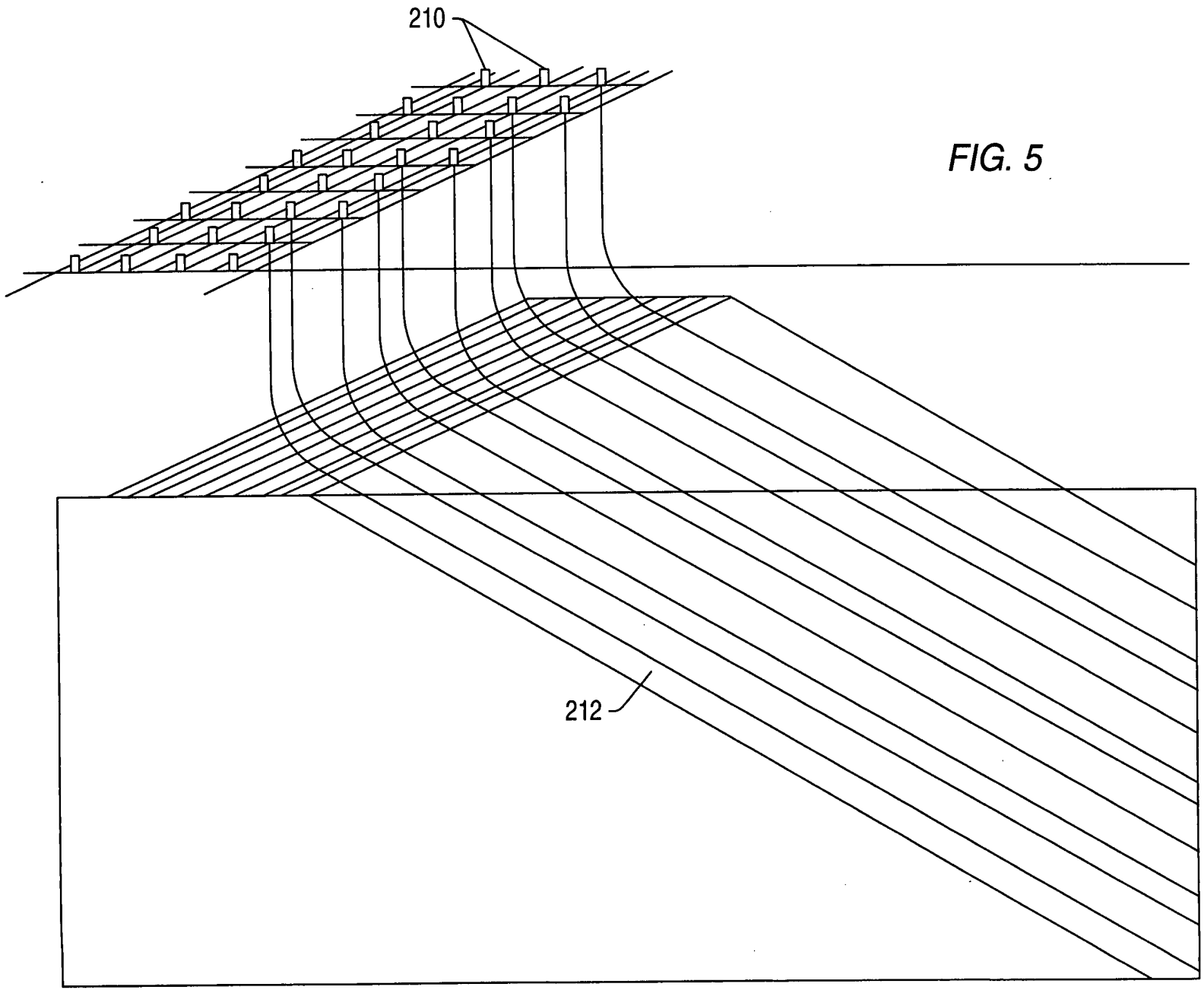

FIG. 5

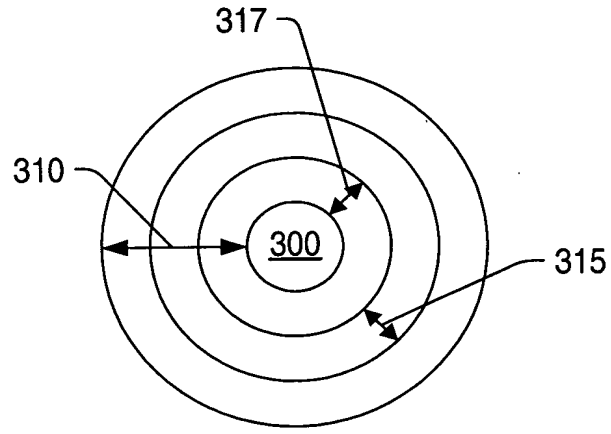

FIG. 6

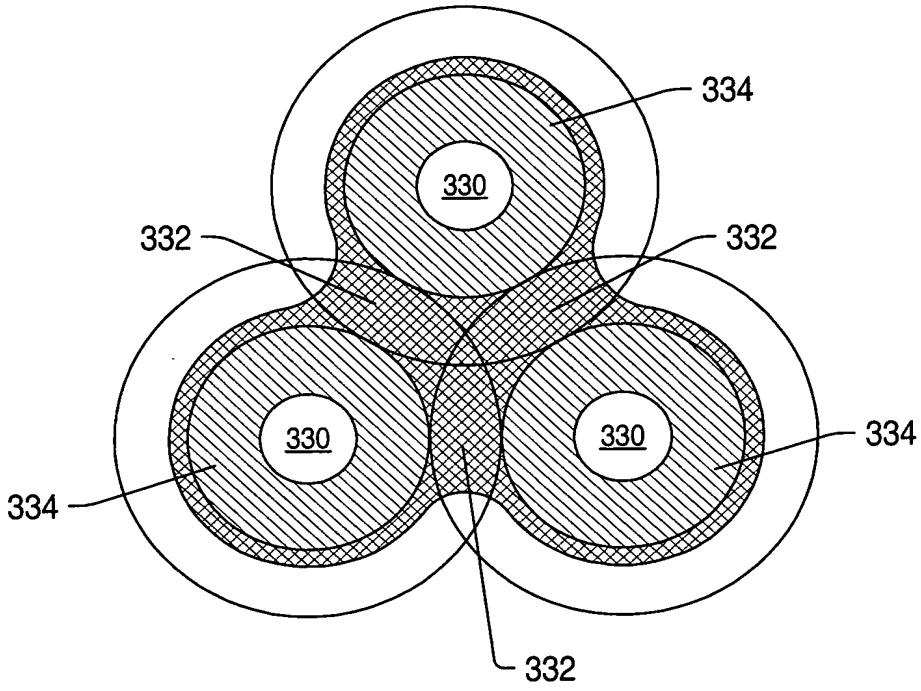

FIG. 7

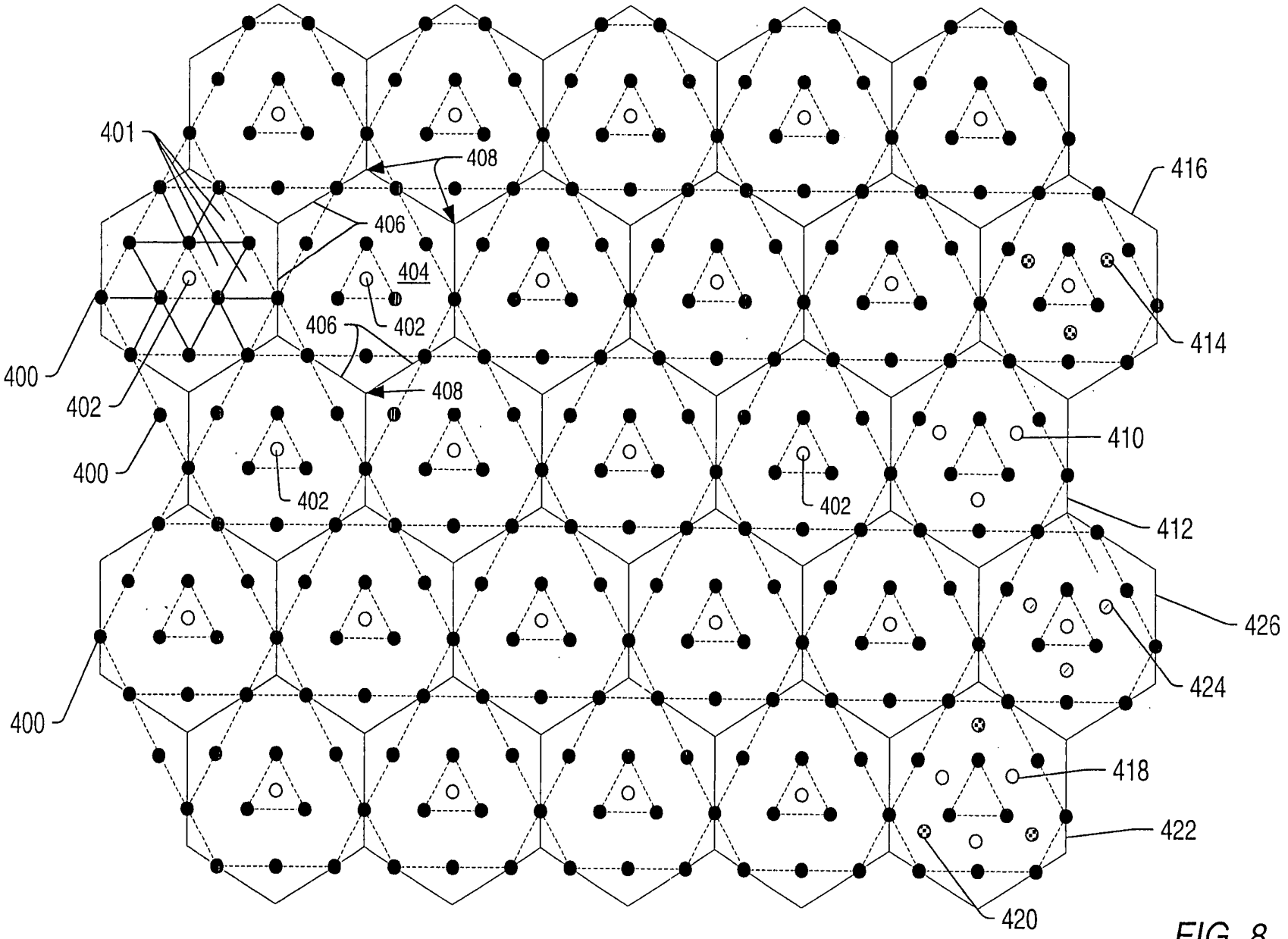

FIG. 8

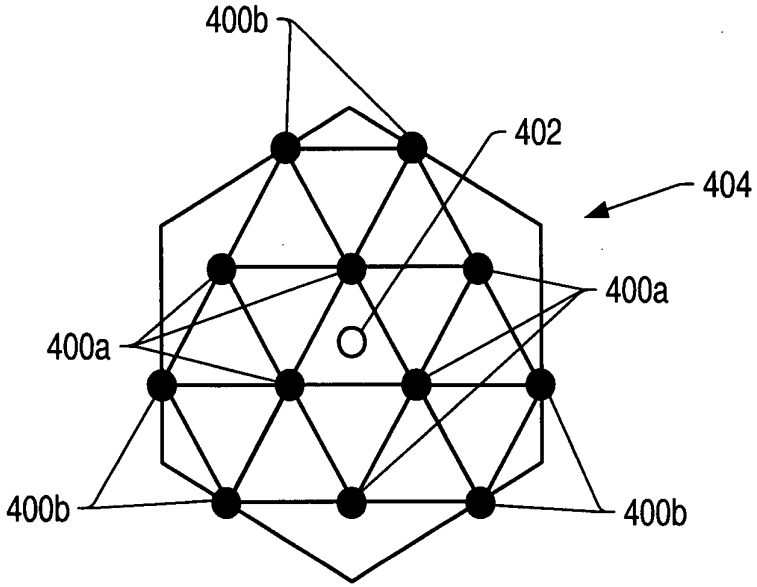

FIG. 9

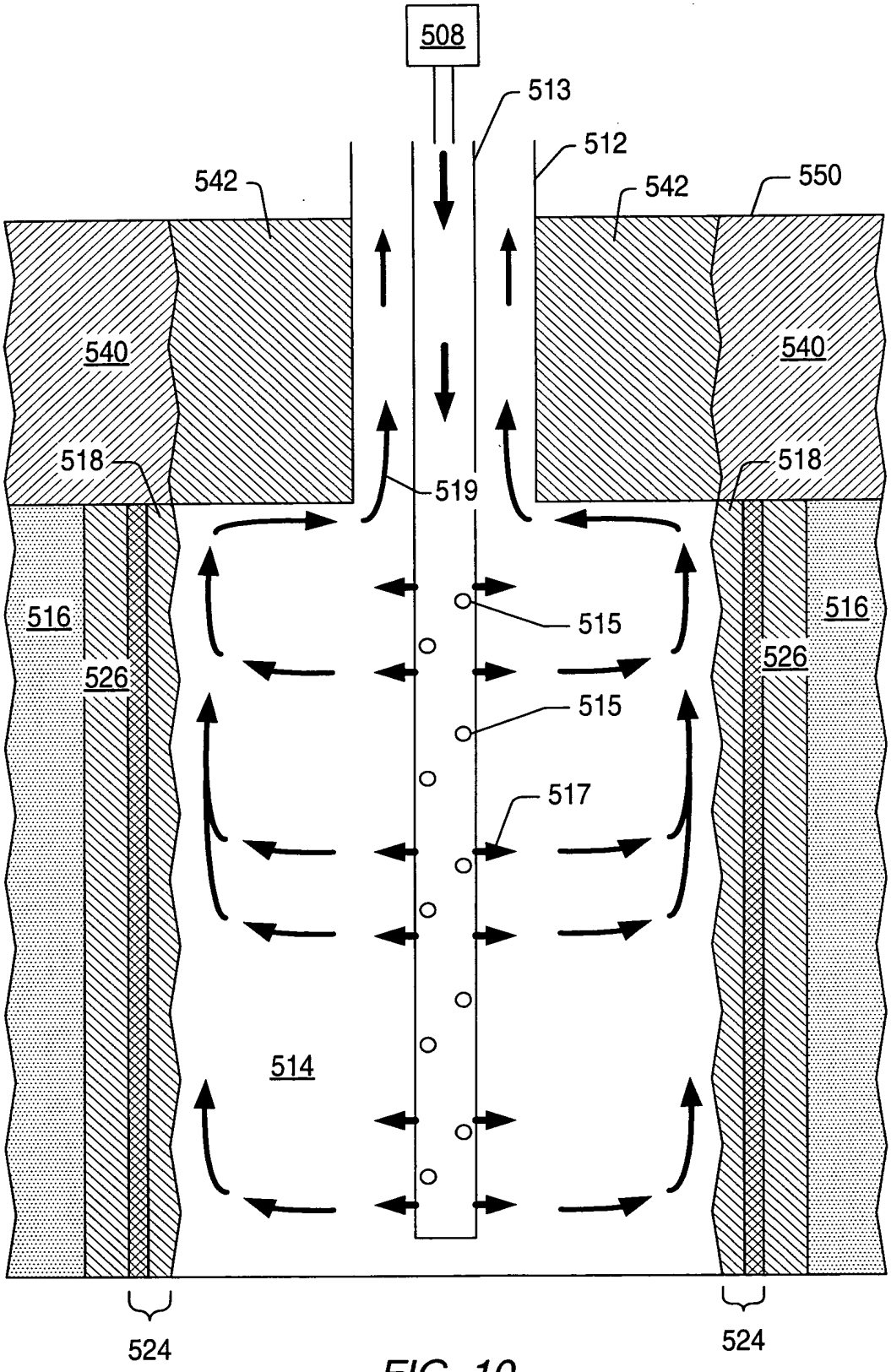
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FIG. 10

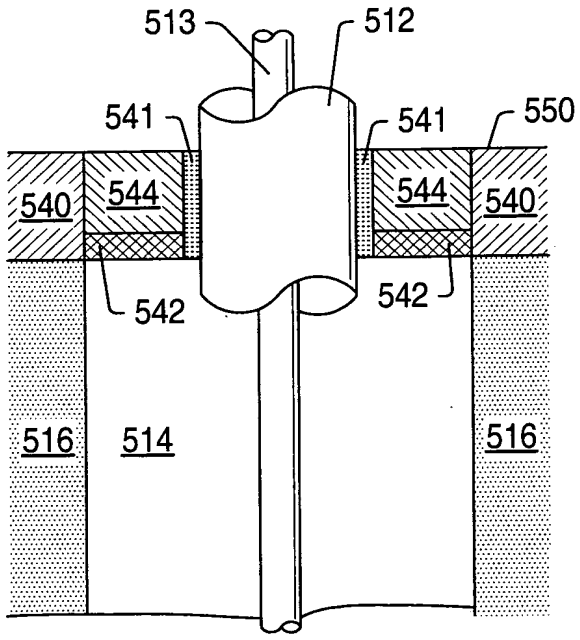
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FIG. 11

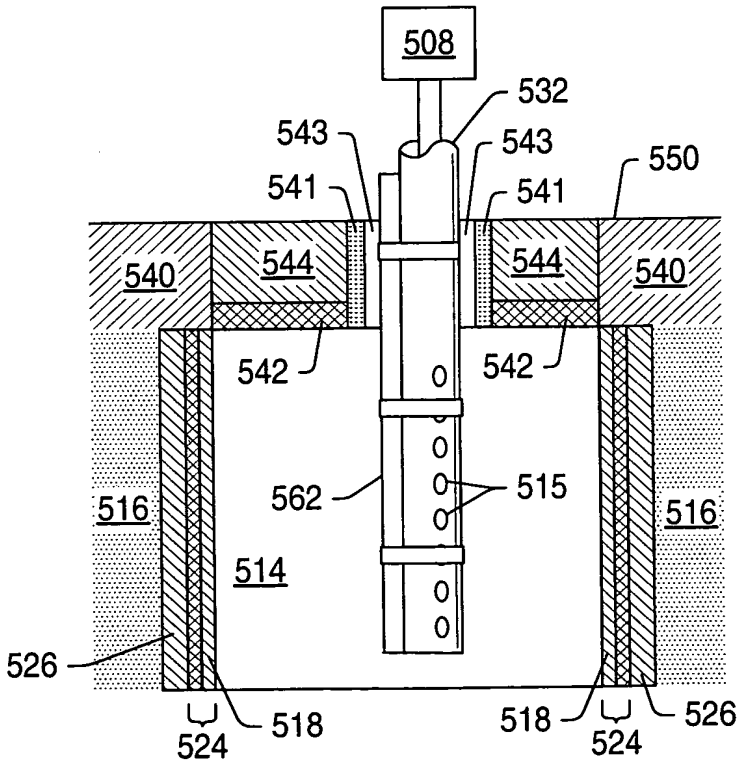
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FIG. 12

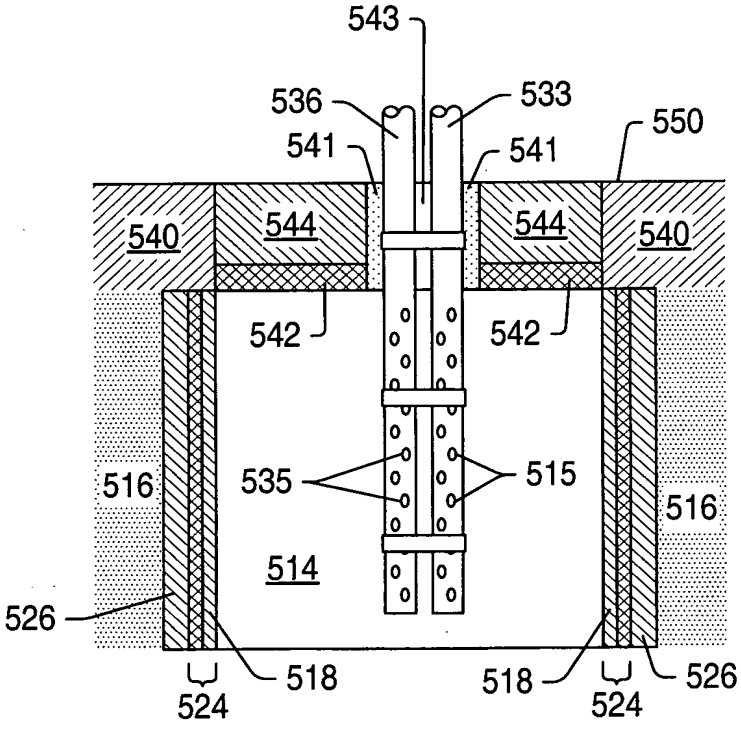
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Fig. 13

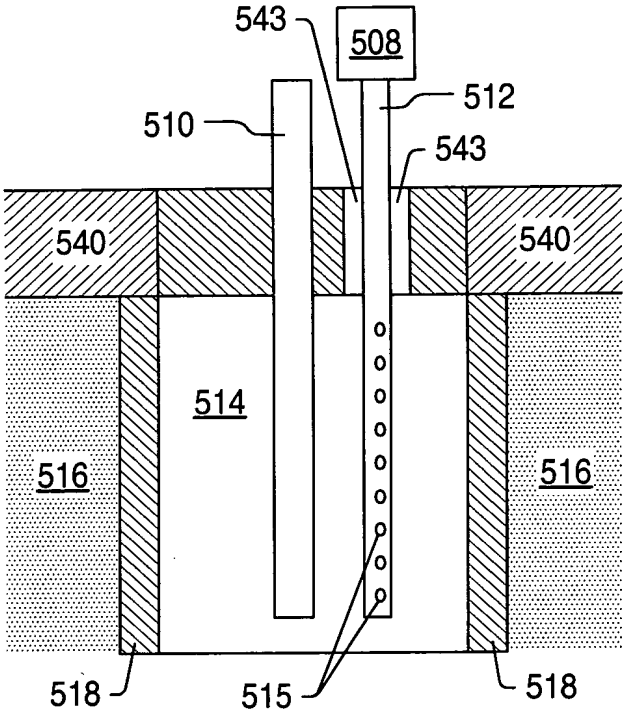
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FIG. 14

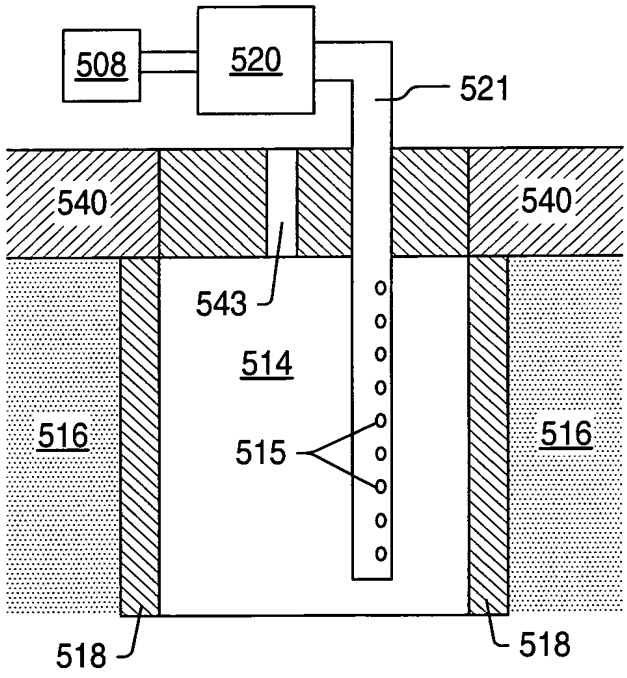
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FIG. 15

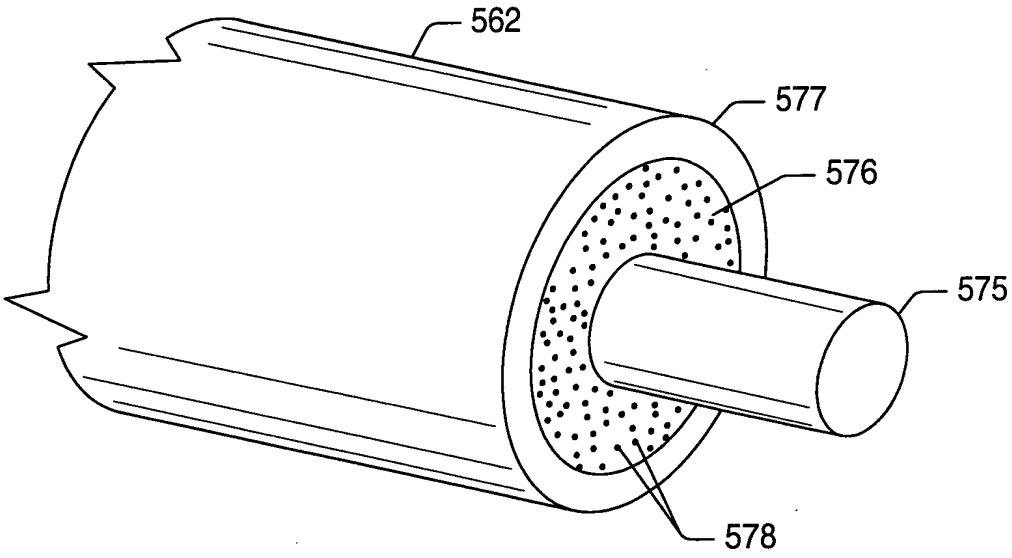


FIG. 16

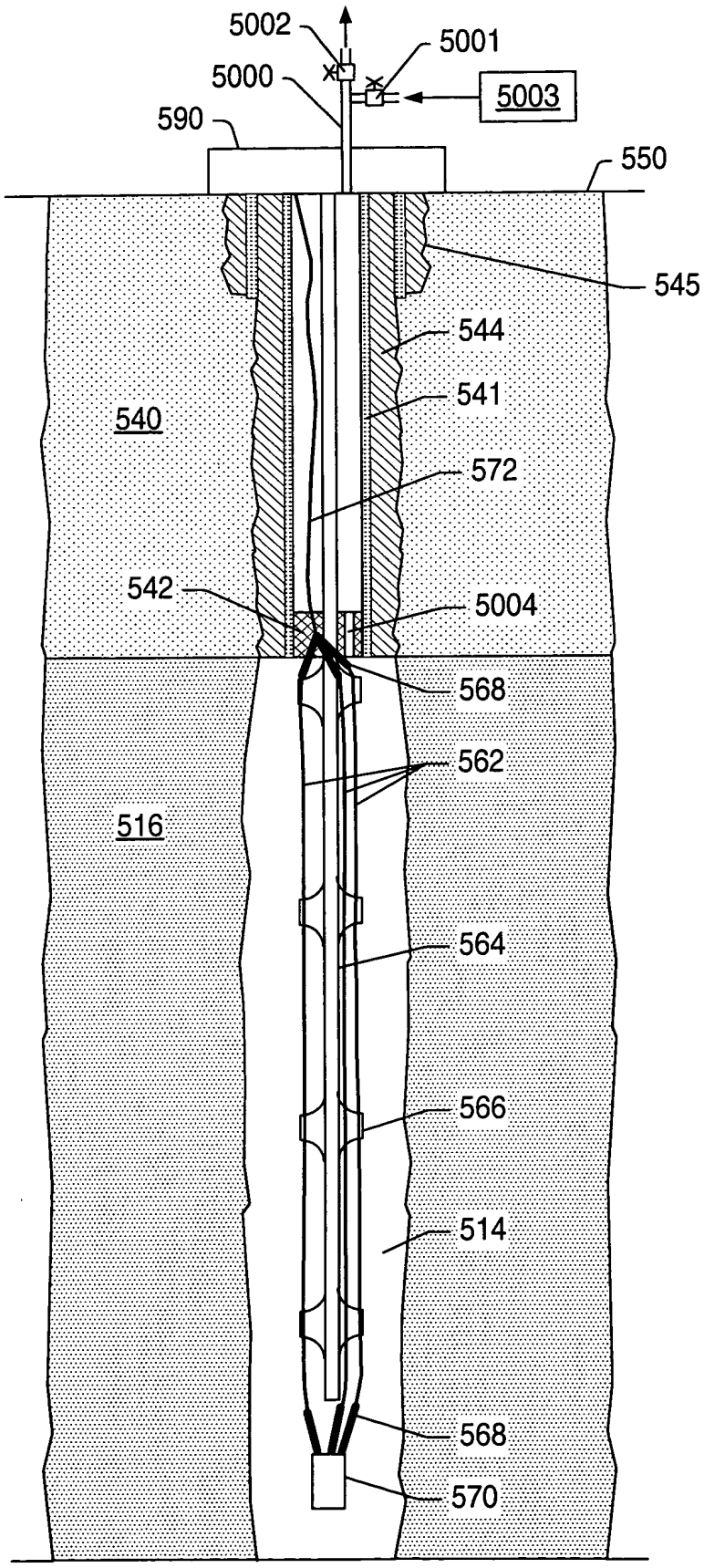


FIG. 17

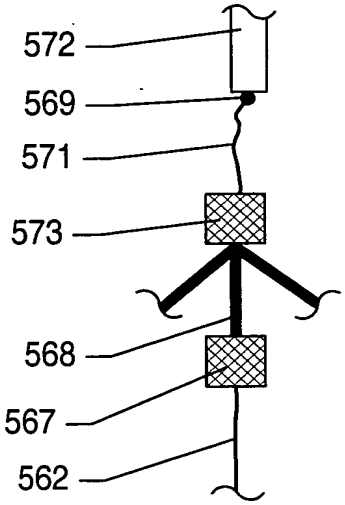
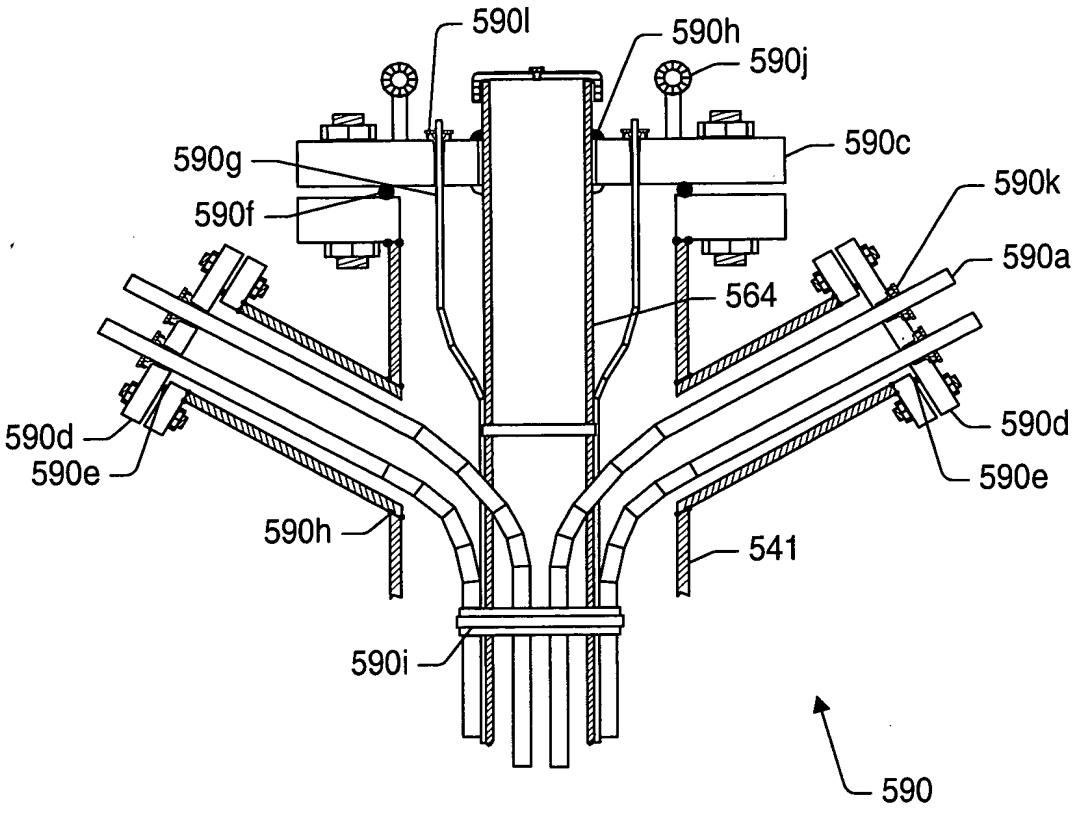


FIG. 17A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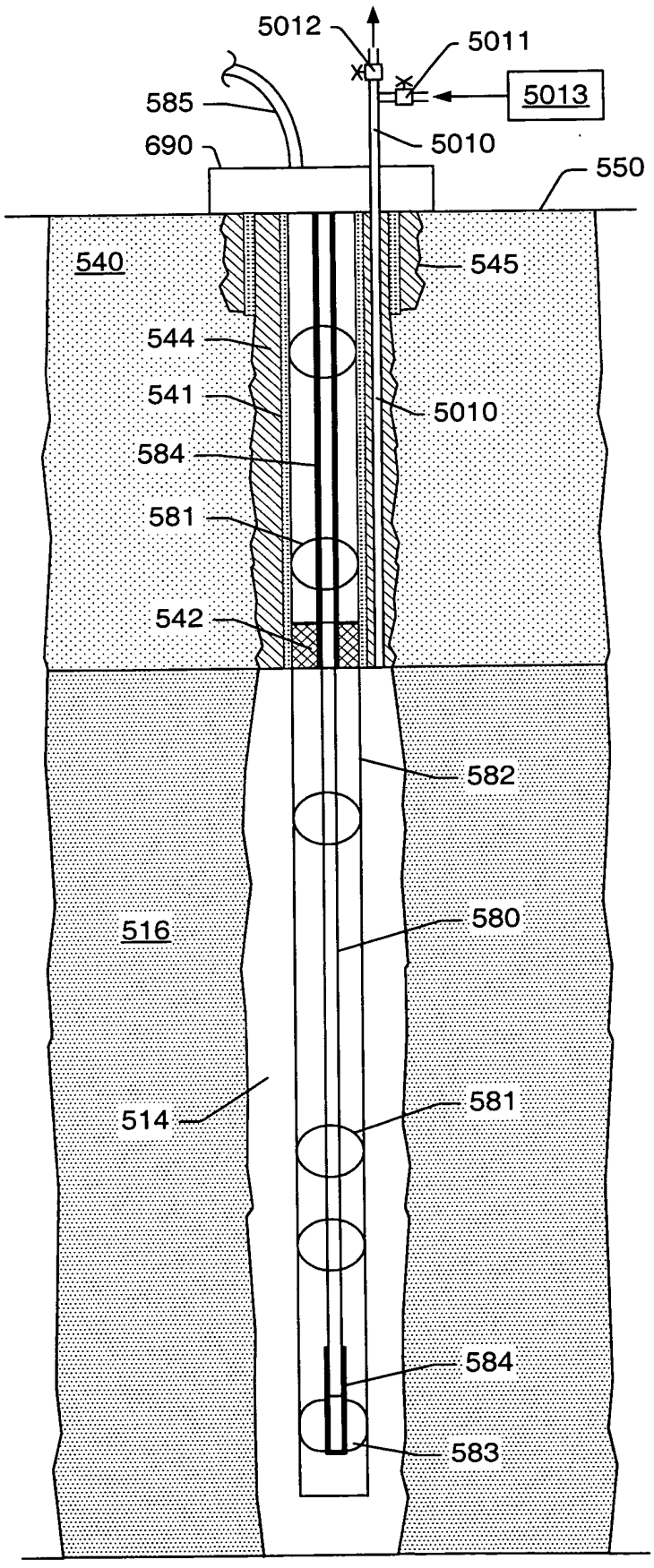
590a
564
590d
590e
590h
590d
590e
541
590i
590

FIG. 18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690
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584
583

FIG. 19

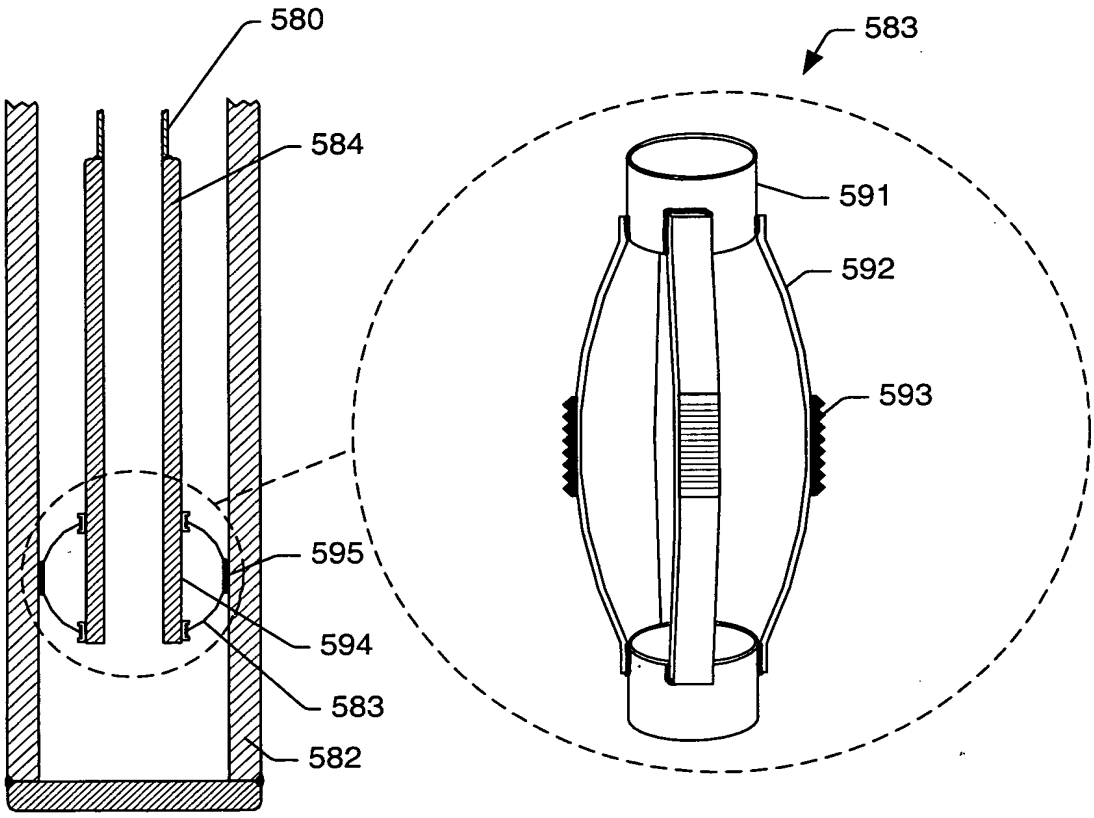
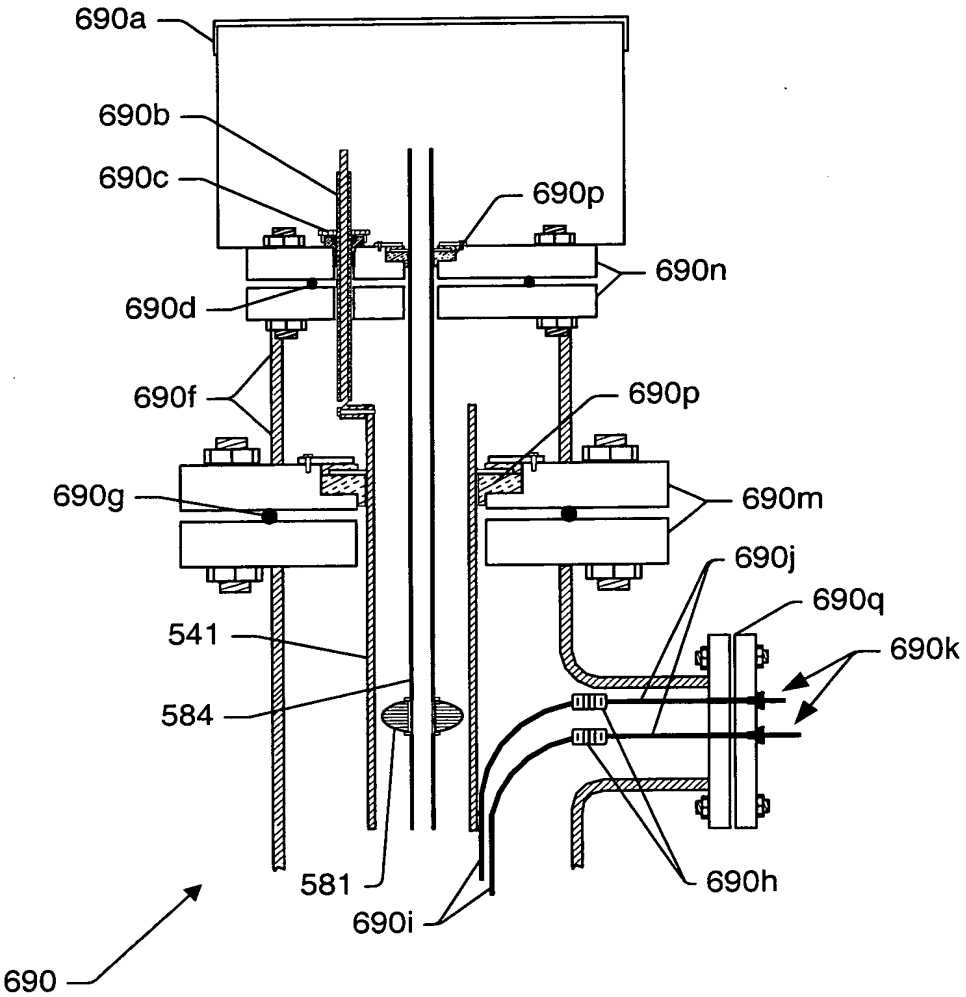


FIG. 20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690b
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690p
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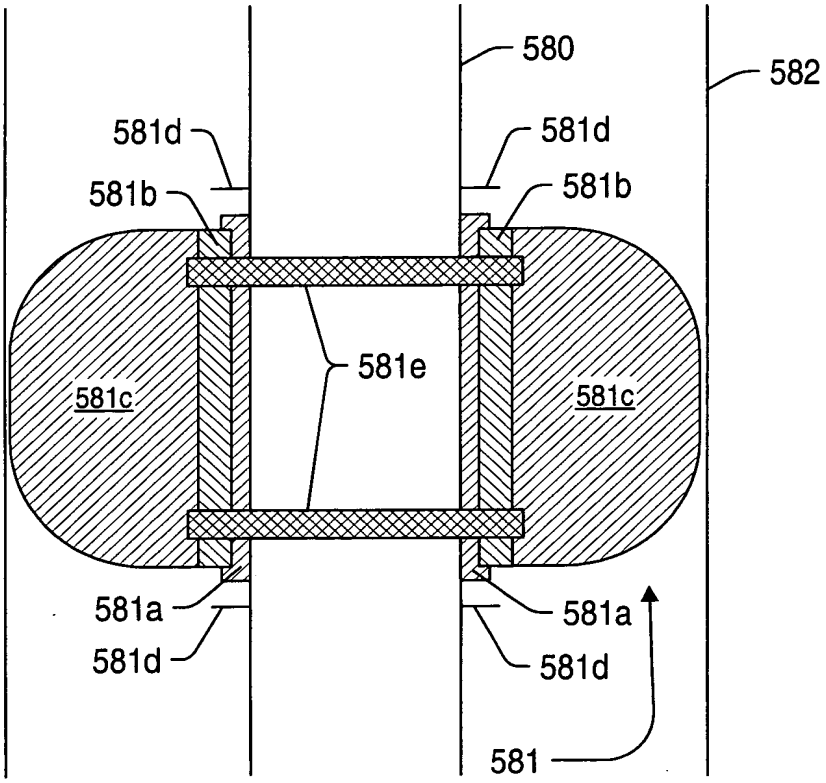
690g
690m
690j
690q
690k
541
584
581
690h
690i
690

FIG. 21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582
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581b
581e
581c
581c
581a
581a
581d
581d
581

FIG. 22

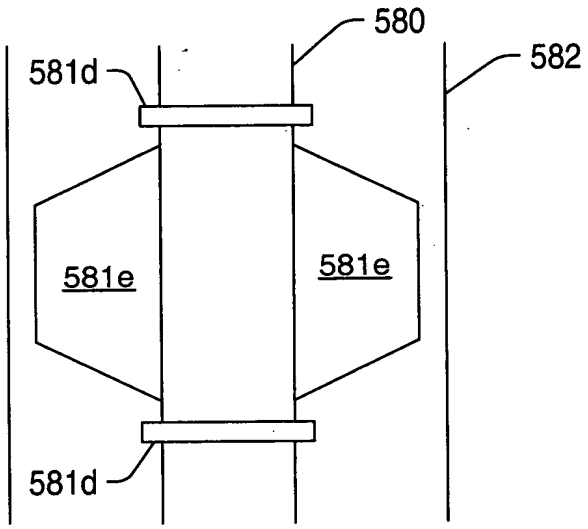

FIG. 23a

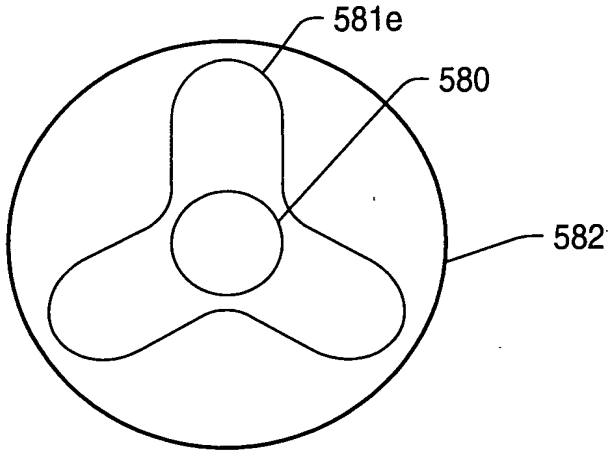

FIG. 23b

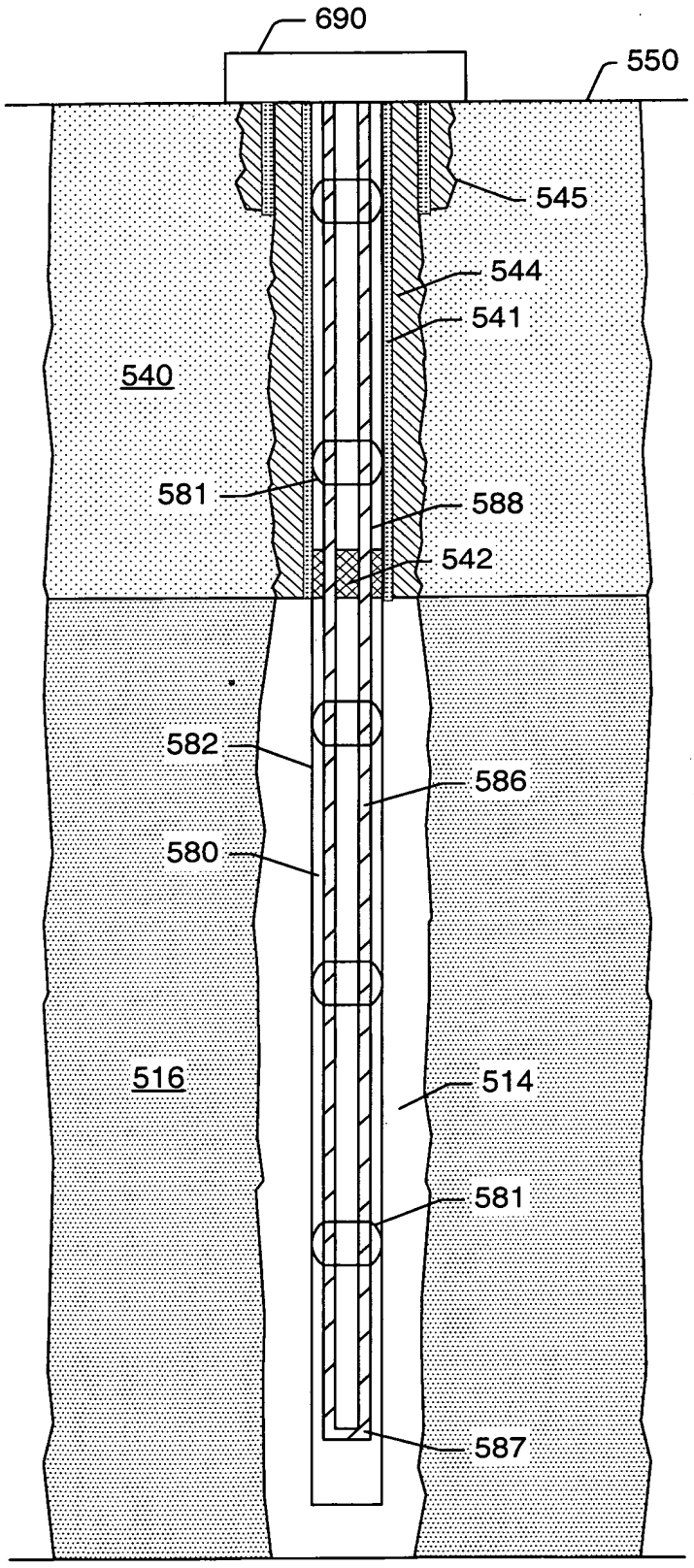

Fig. 24

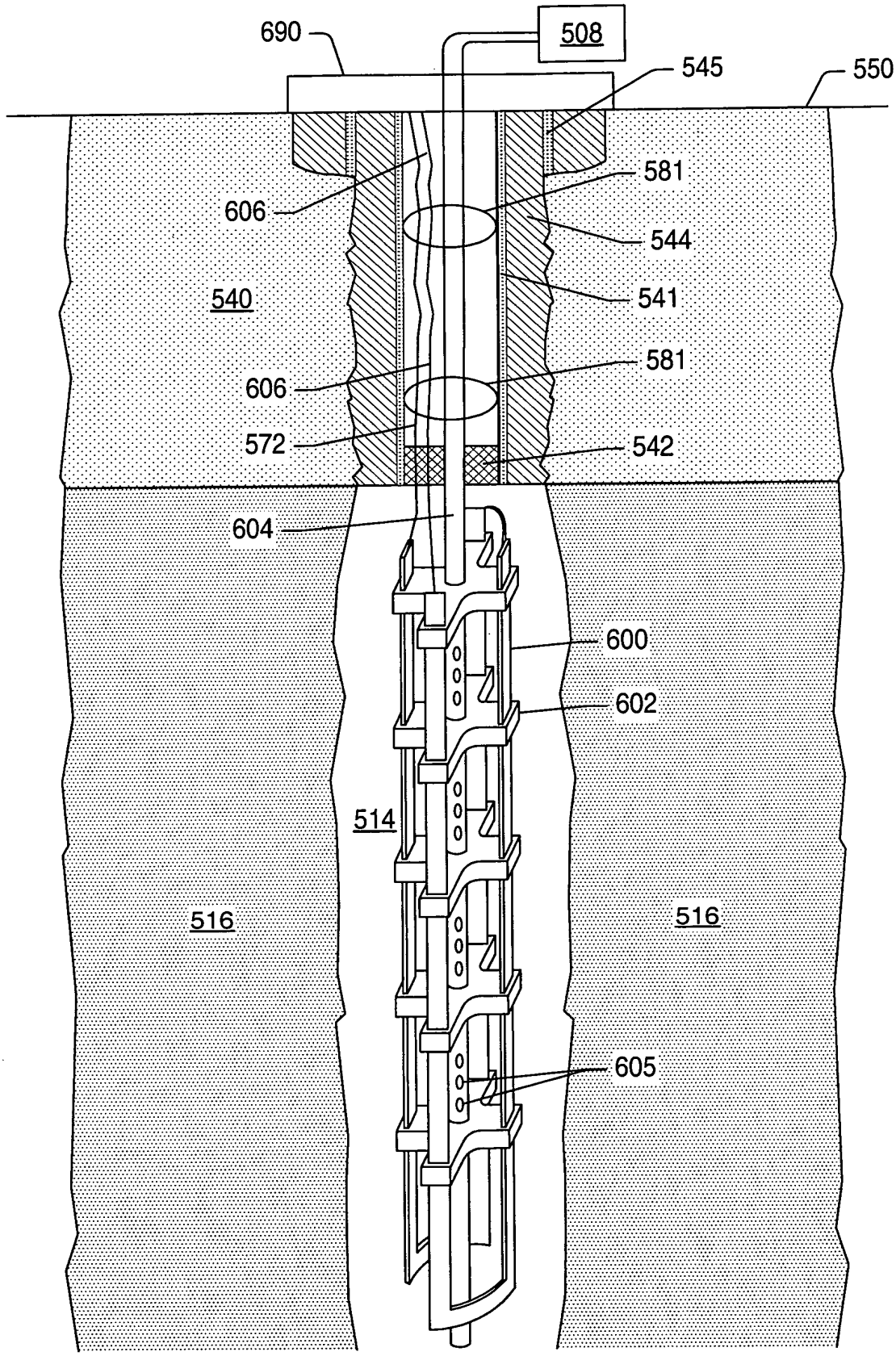
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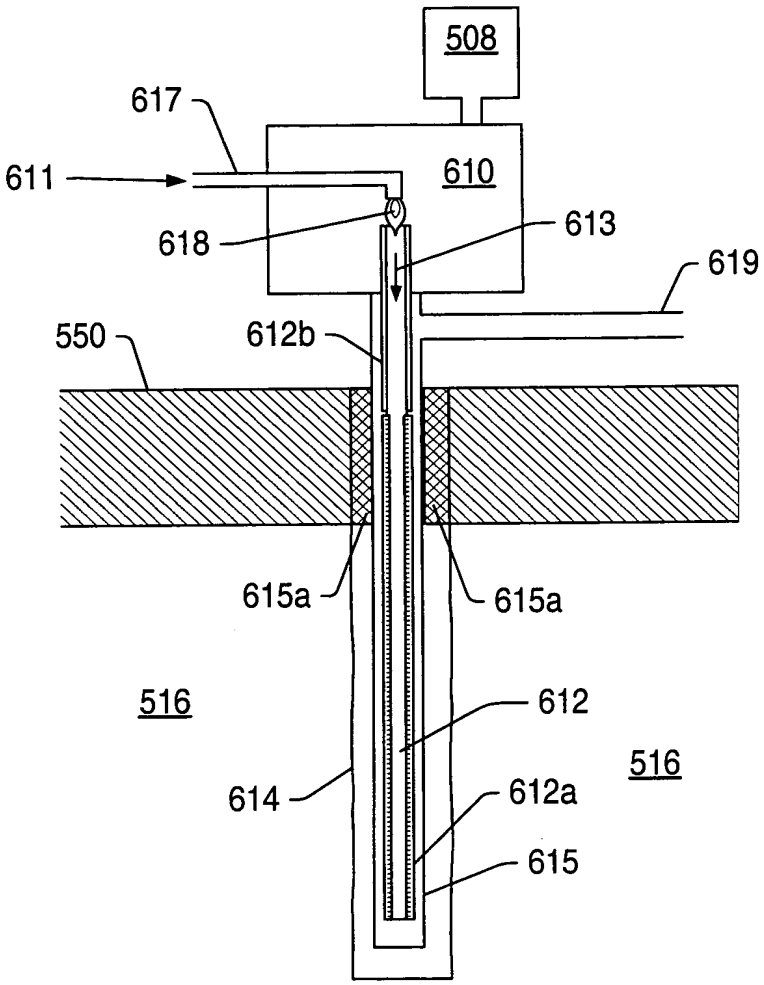
FIG. 25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617
611
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618
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619
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612b
615a
615a
516
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516
614
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615

FIG. 26

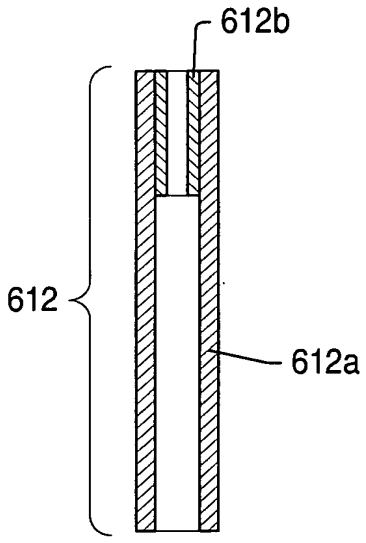
612b
612
612a

FIG. 27

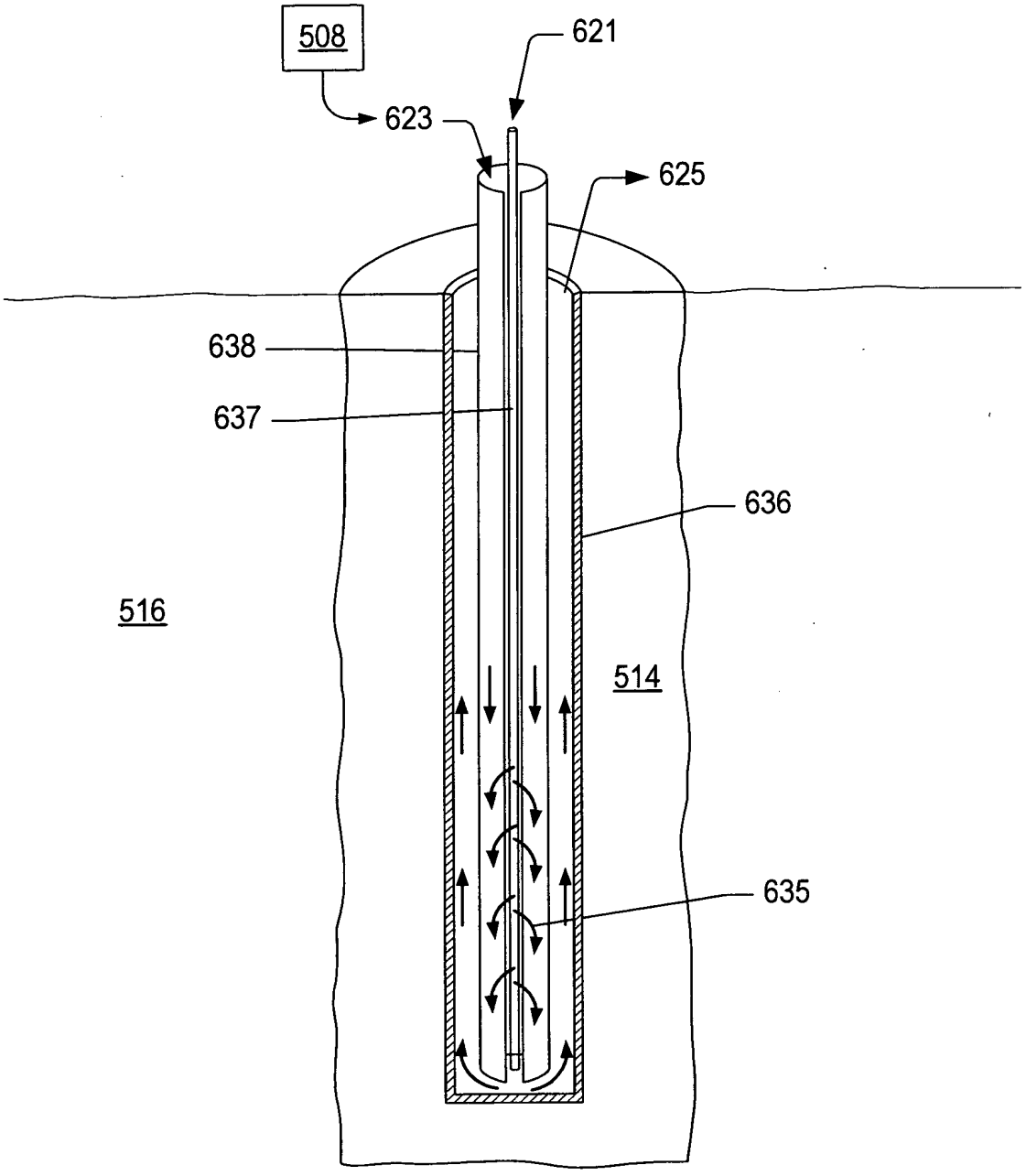

FIG. 28

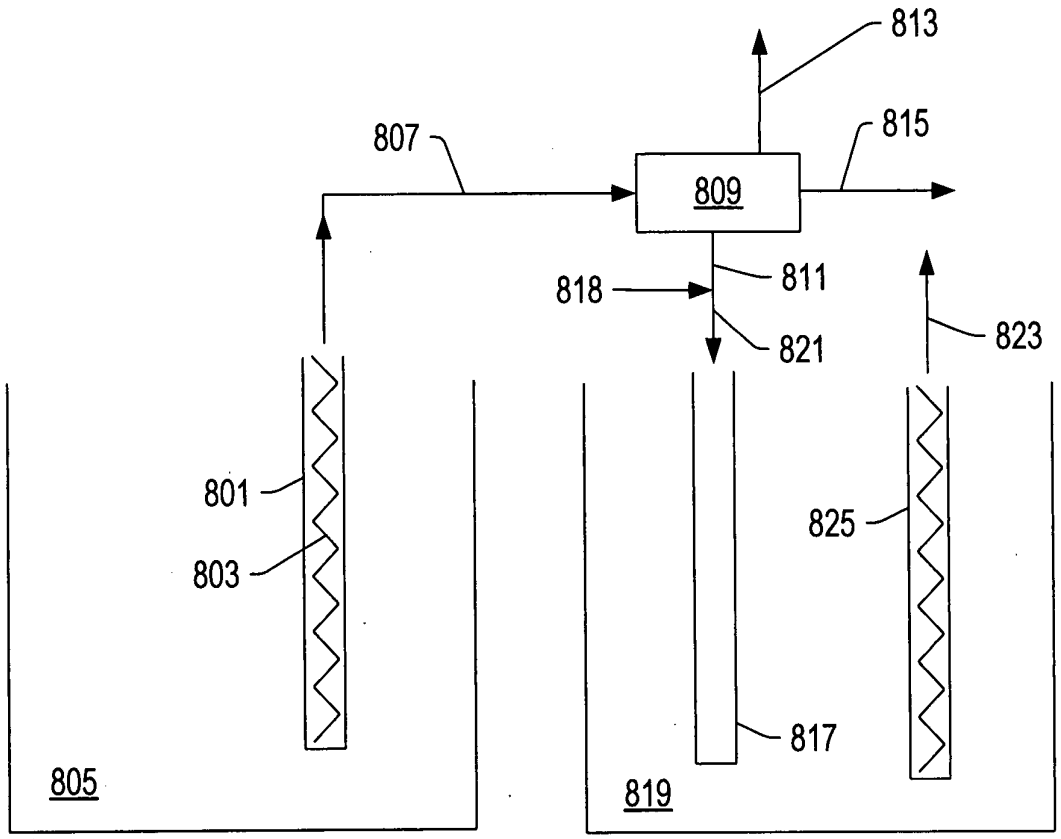

FIG. 29

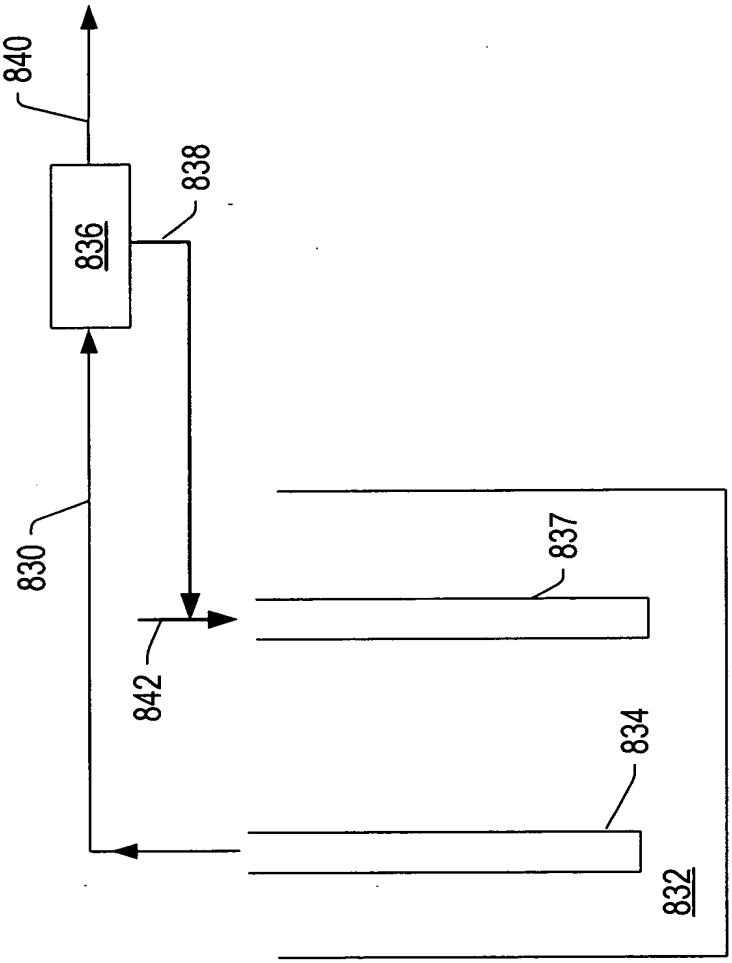

FIG. 30

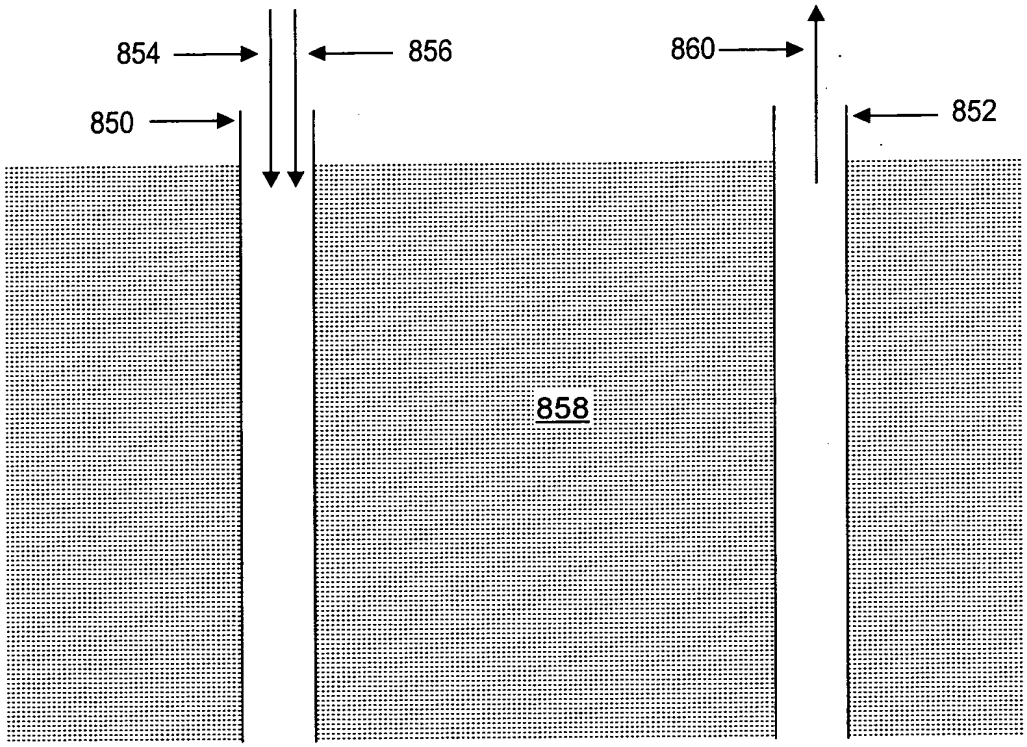

FIG. 31

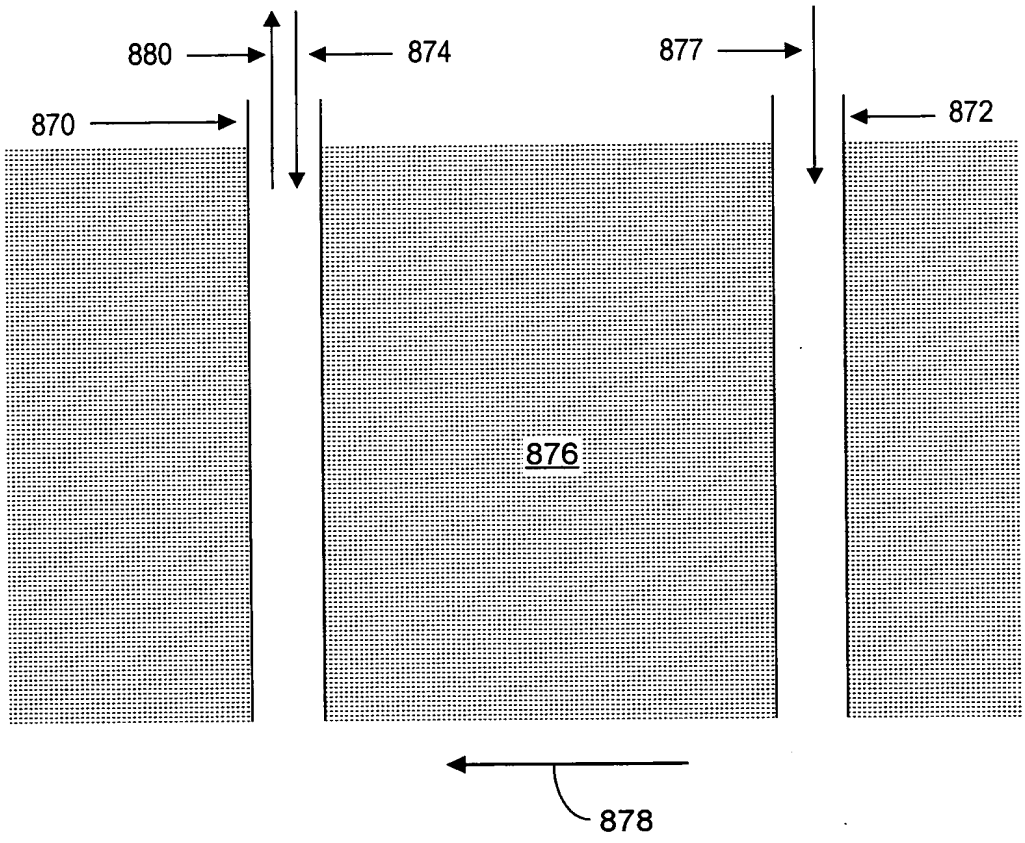

FIG. 32

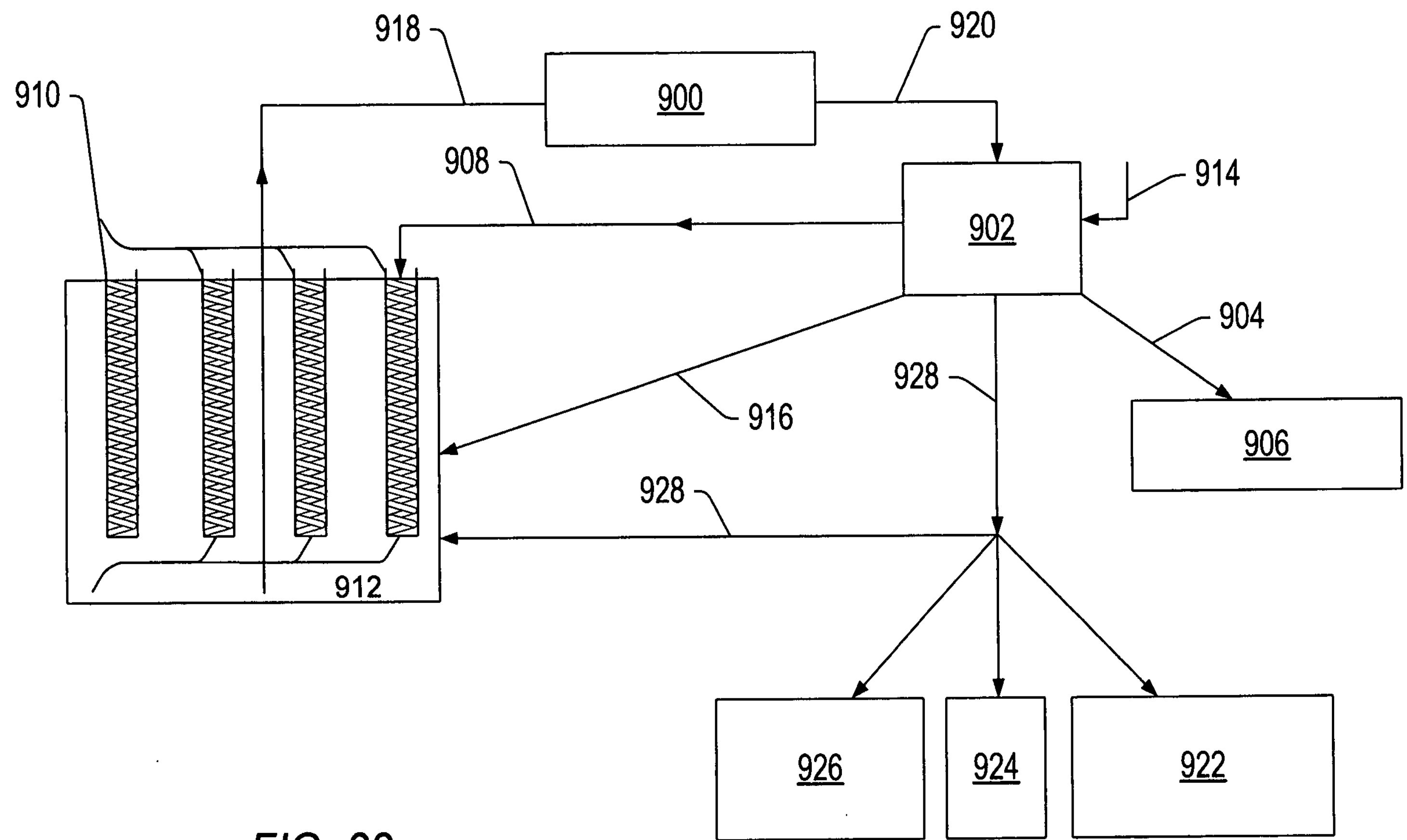

FIG. 33

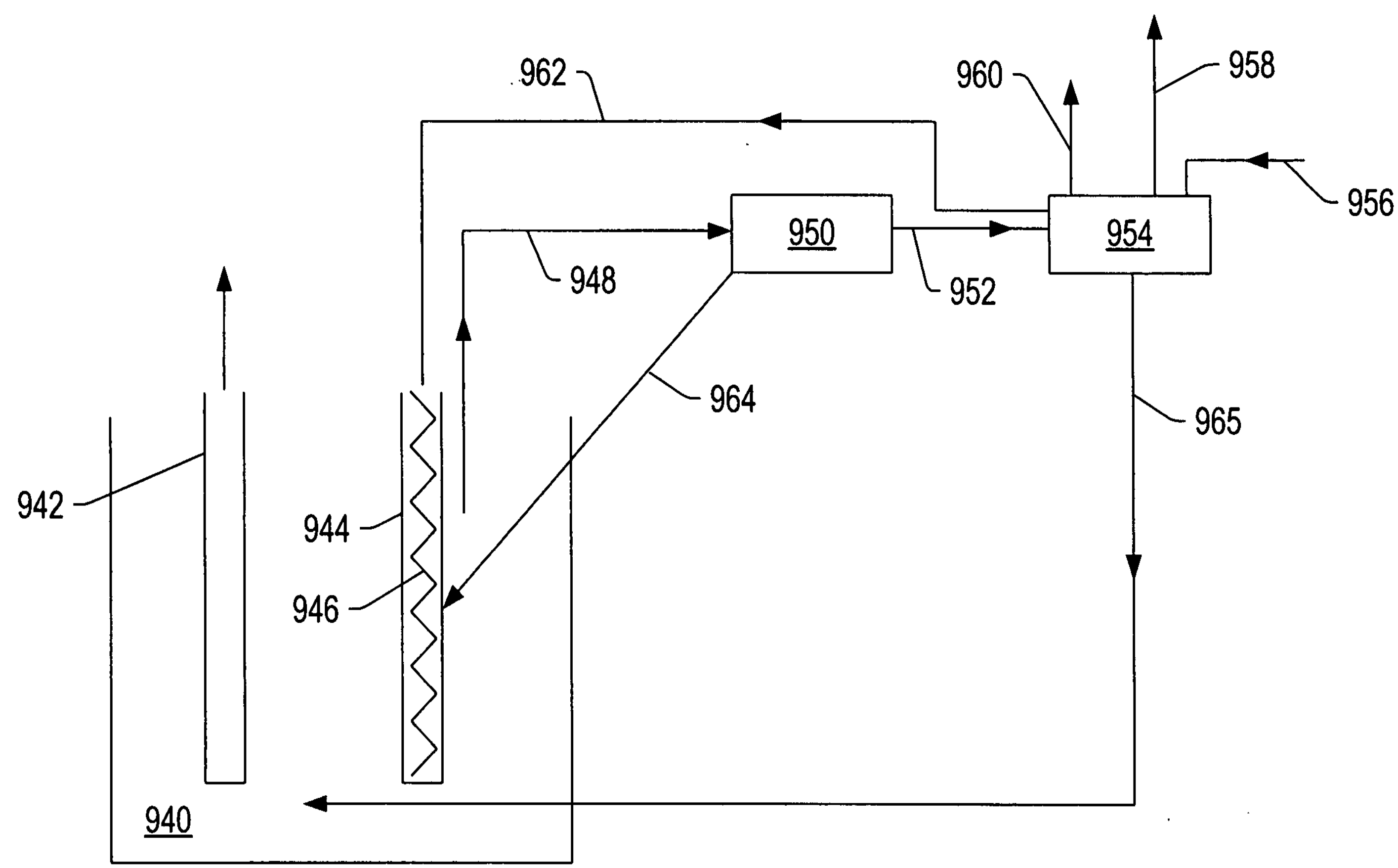

FIG. 34

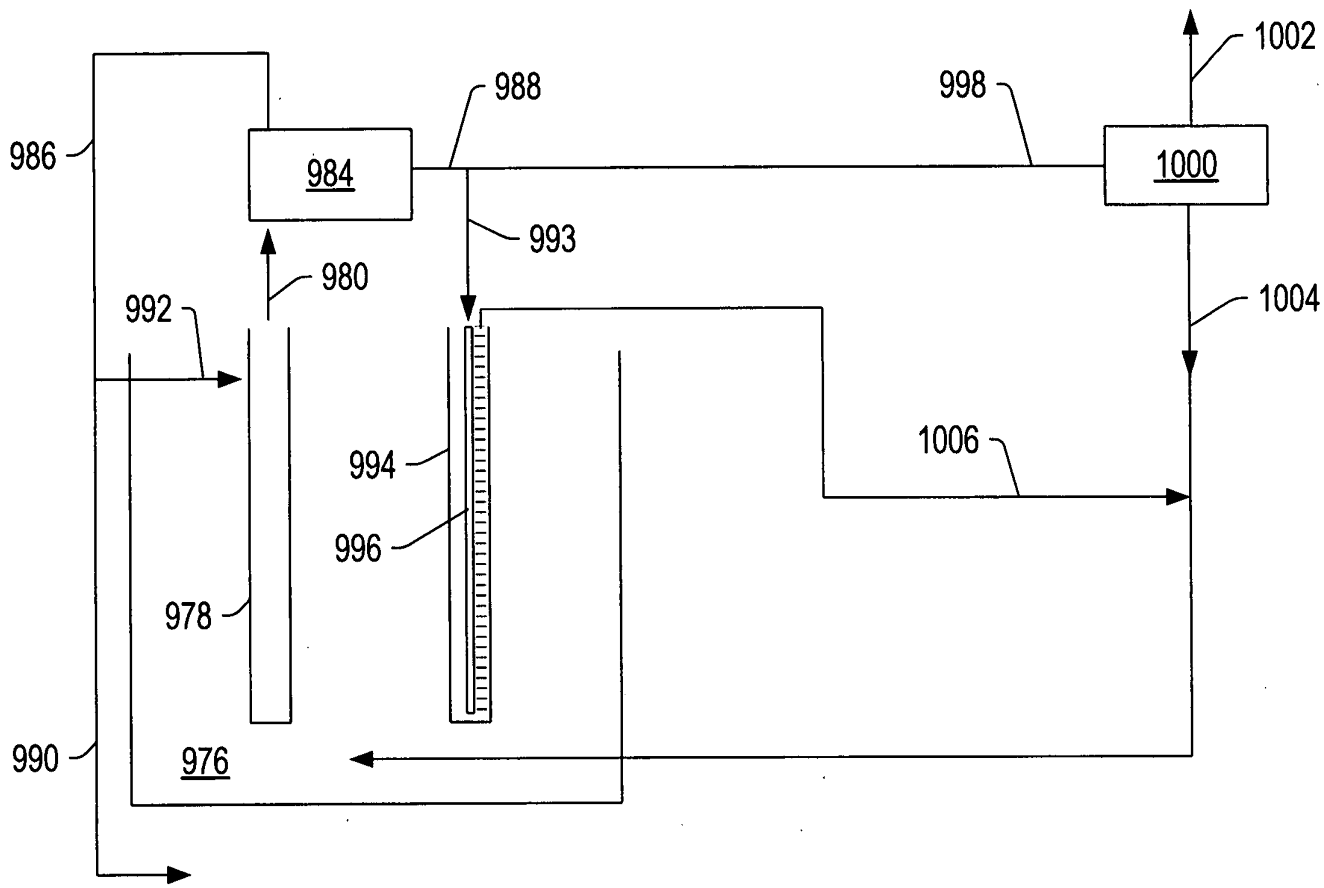
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FIG. 35

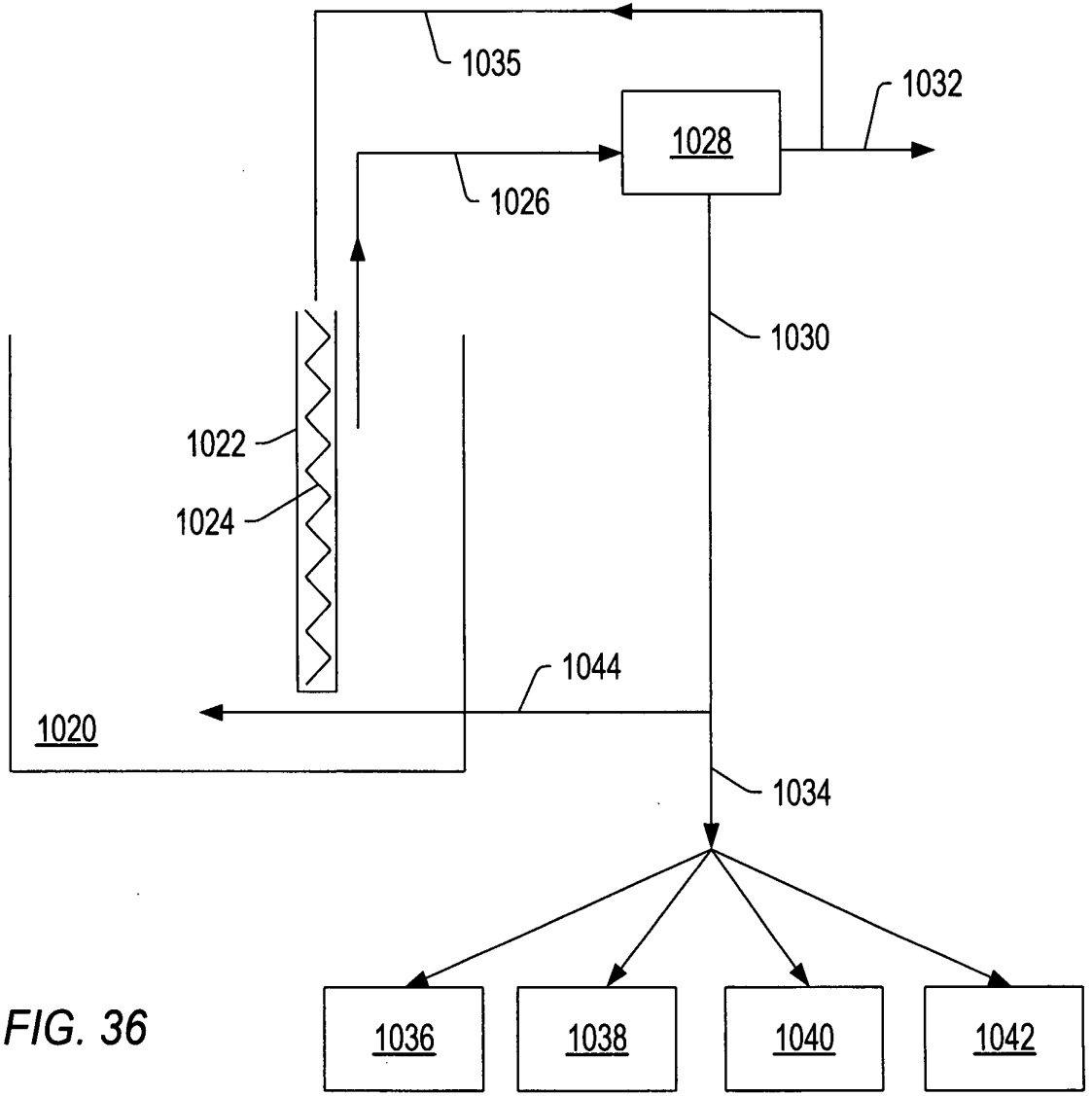

FIG. 36

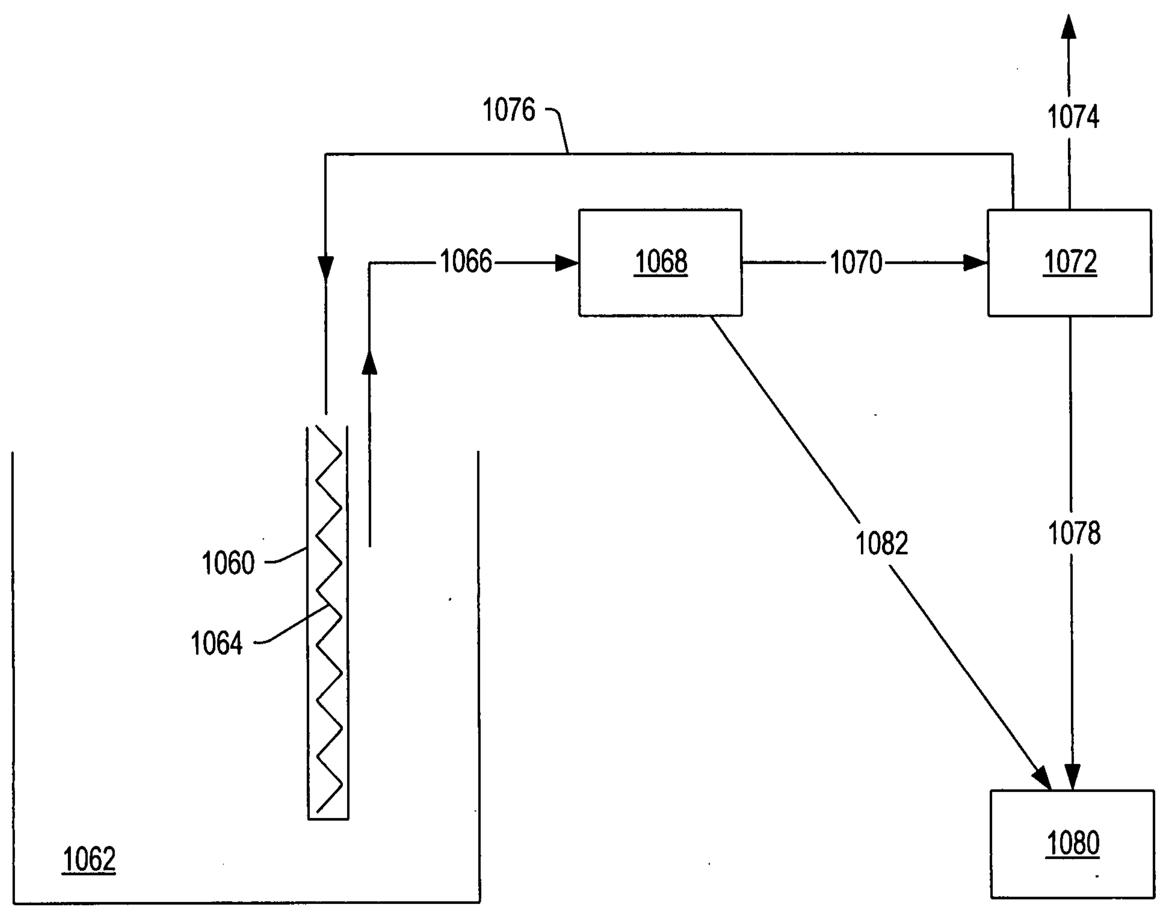

FIG. 37

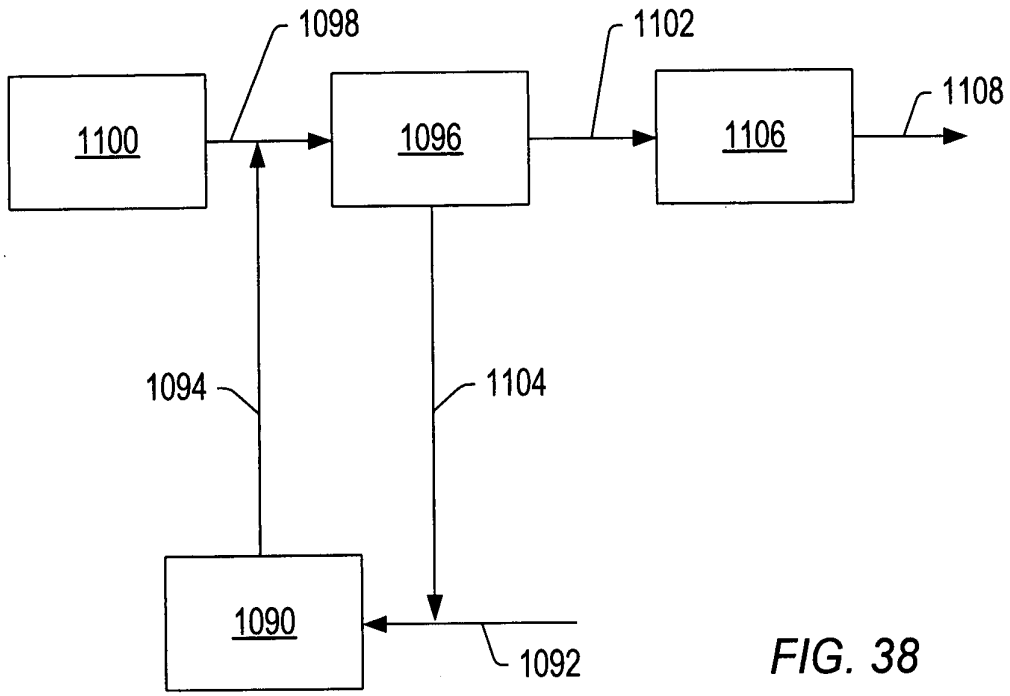

FIG. 38

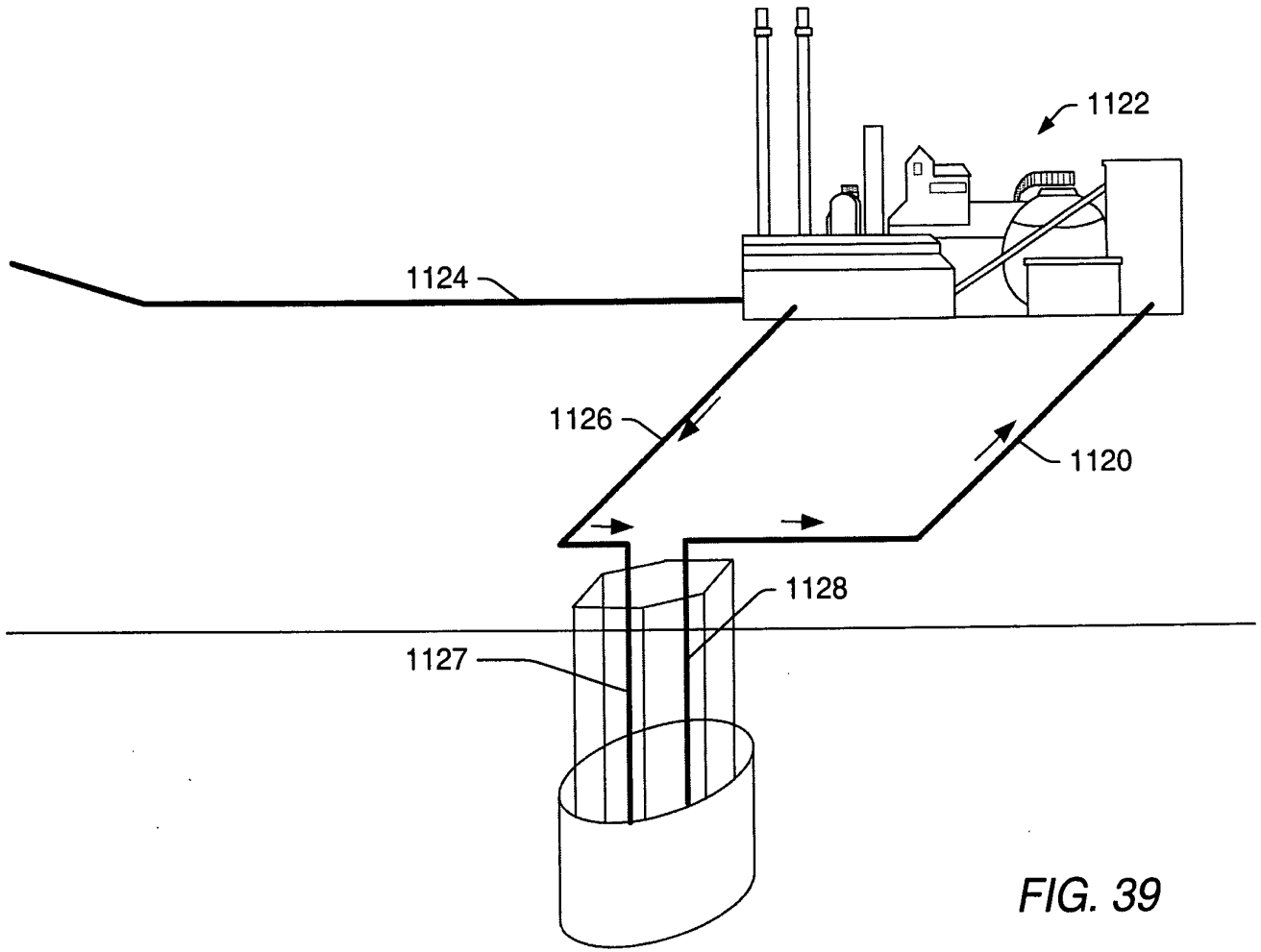

FIG. 39

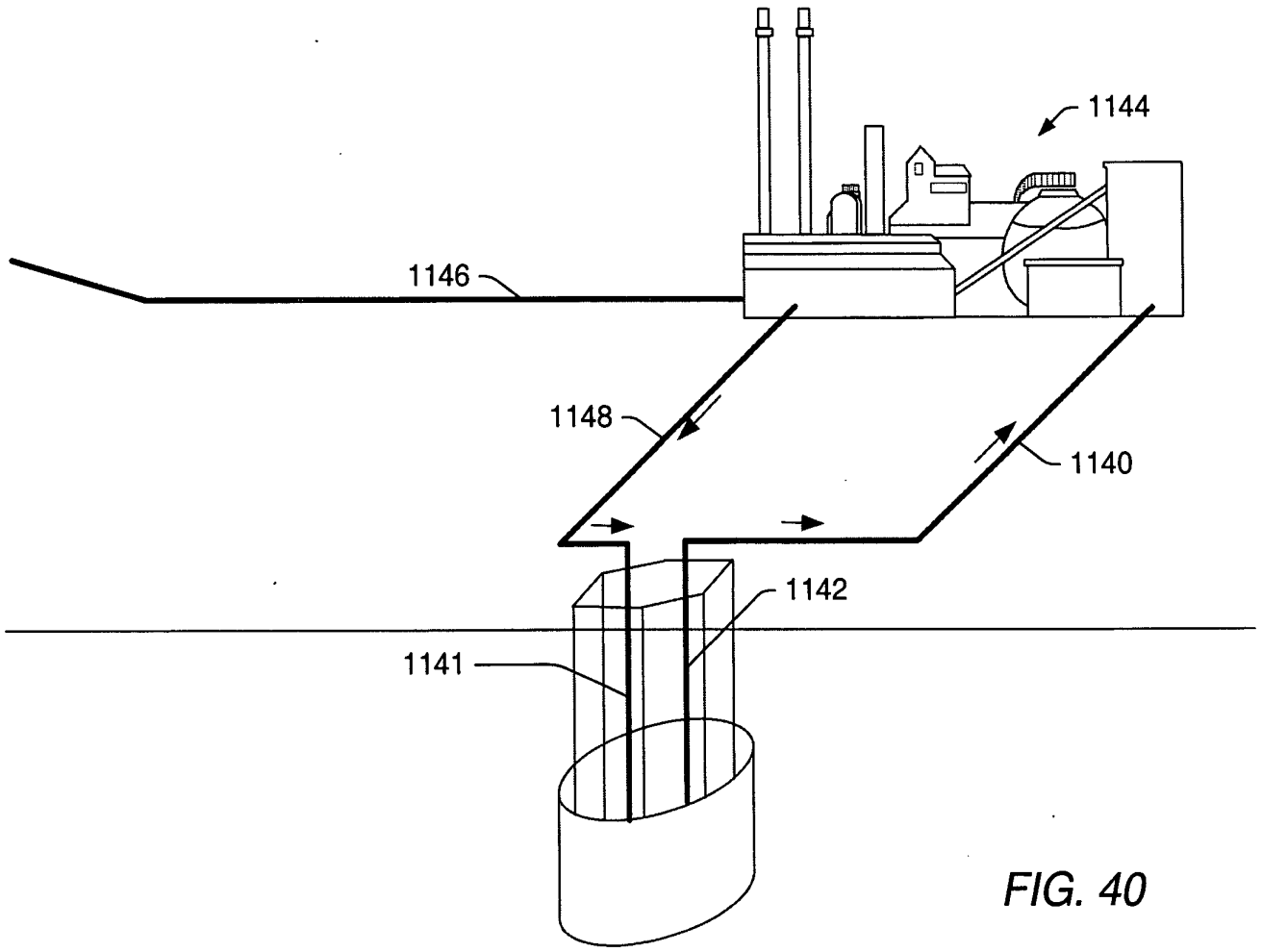

FIG. 40

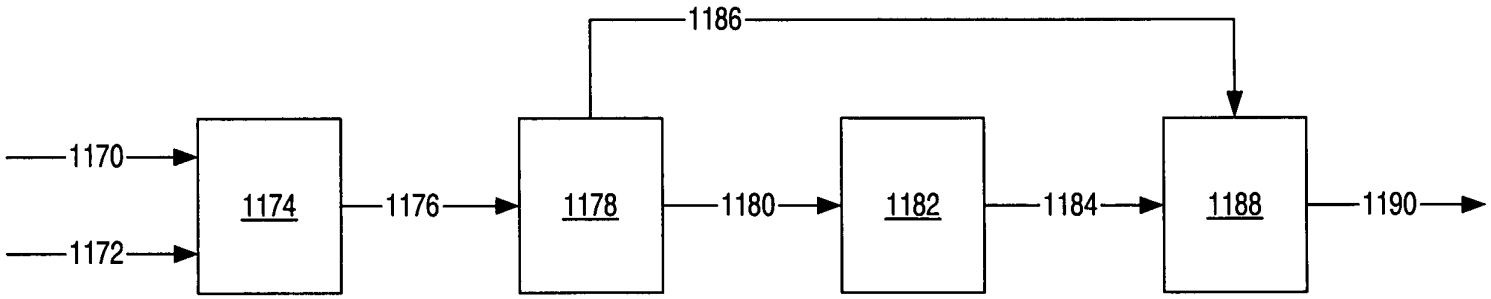

FIG. 41

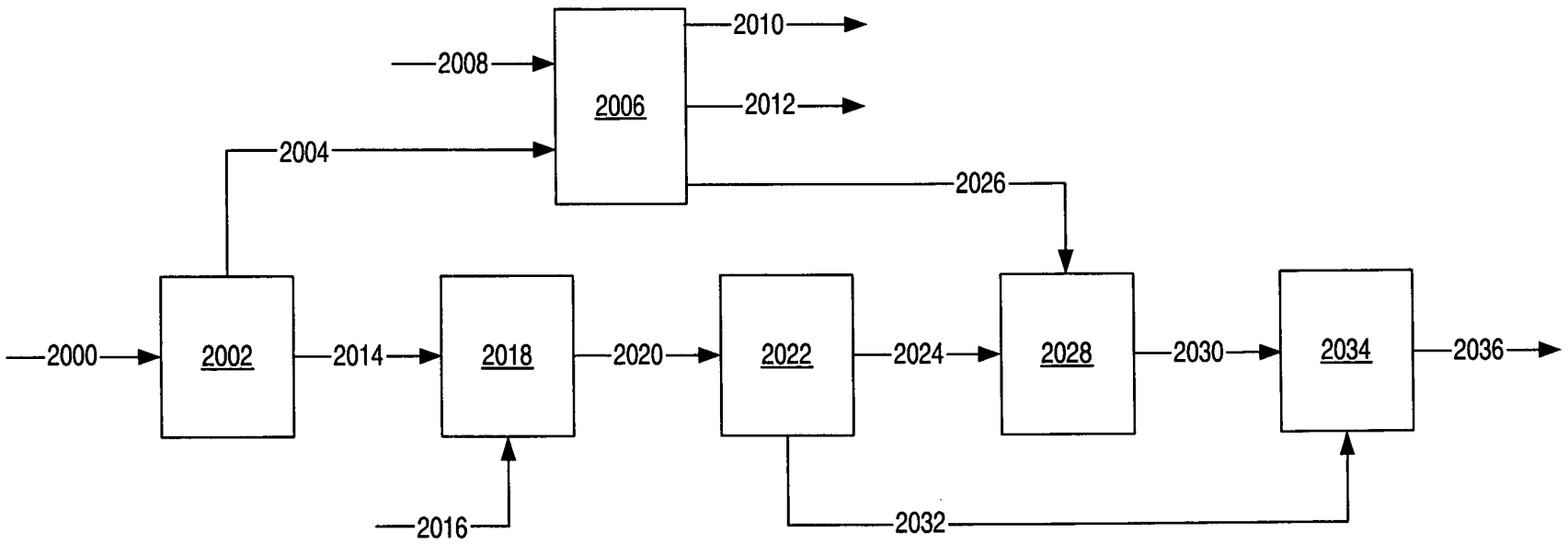
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FIG. 42

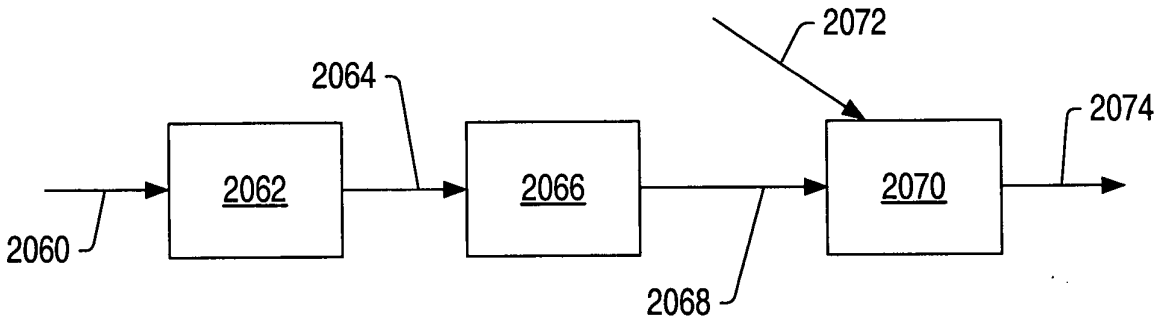
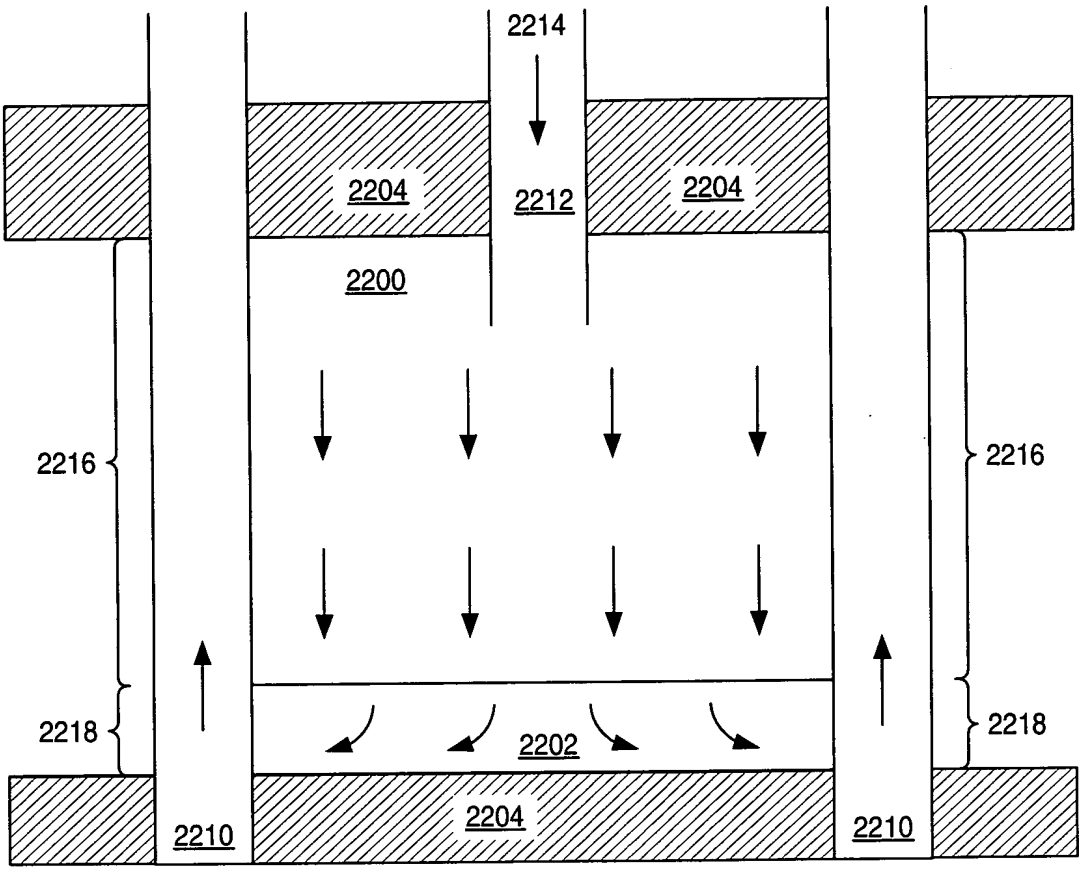


FIG. 43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2204
2210

FIG. 44

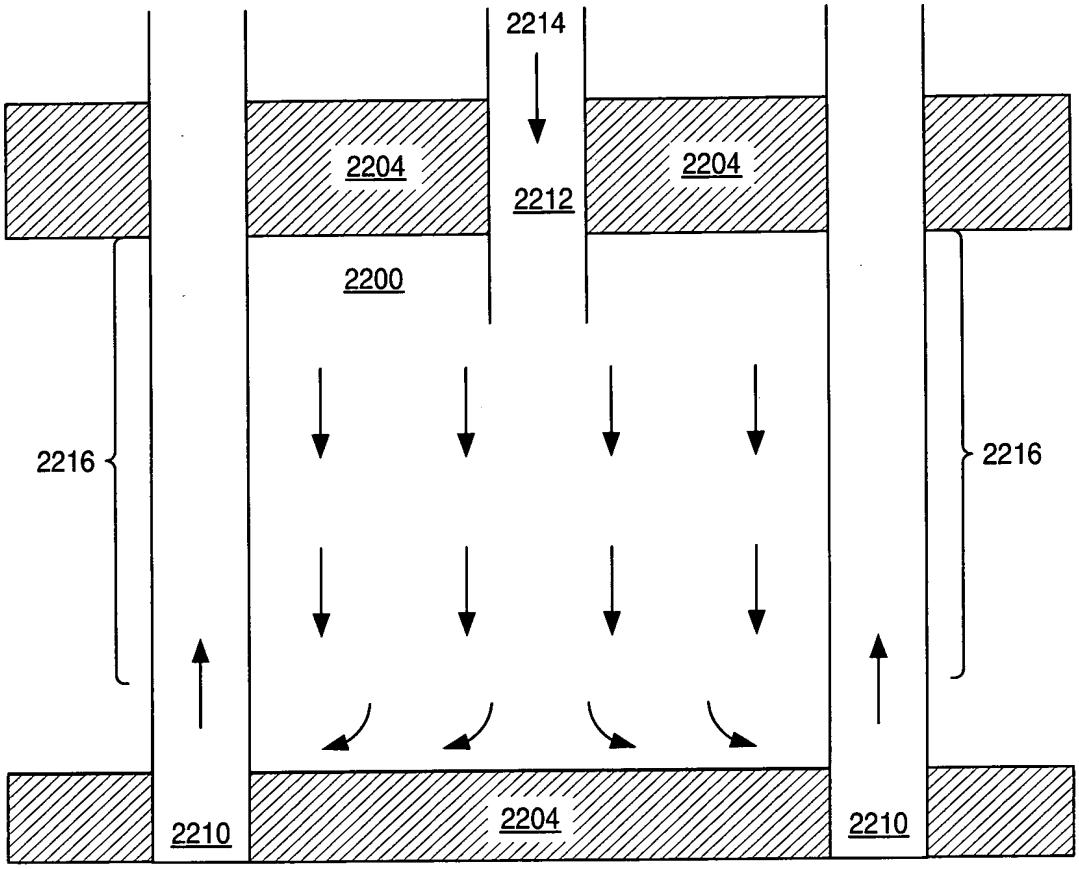
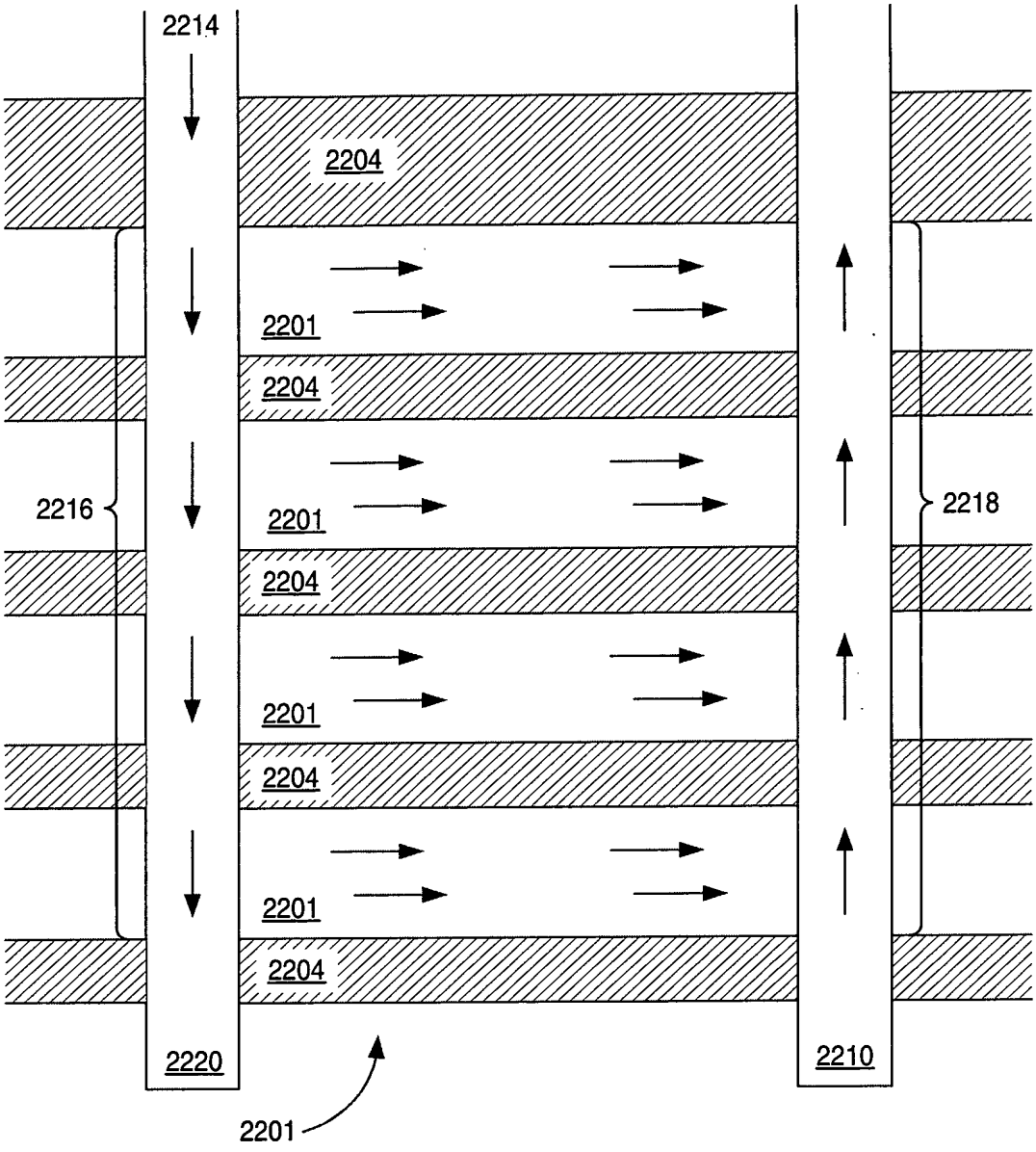


FIG. 45


2214
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2204
2201
2204
2201
2204
2220
2210
2201

FIG. 46

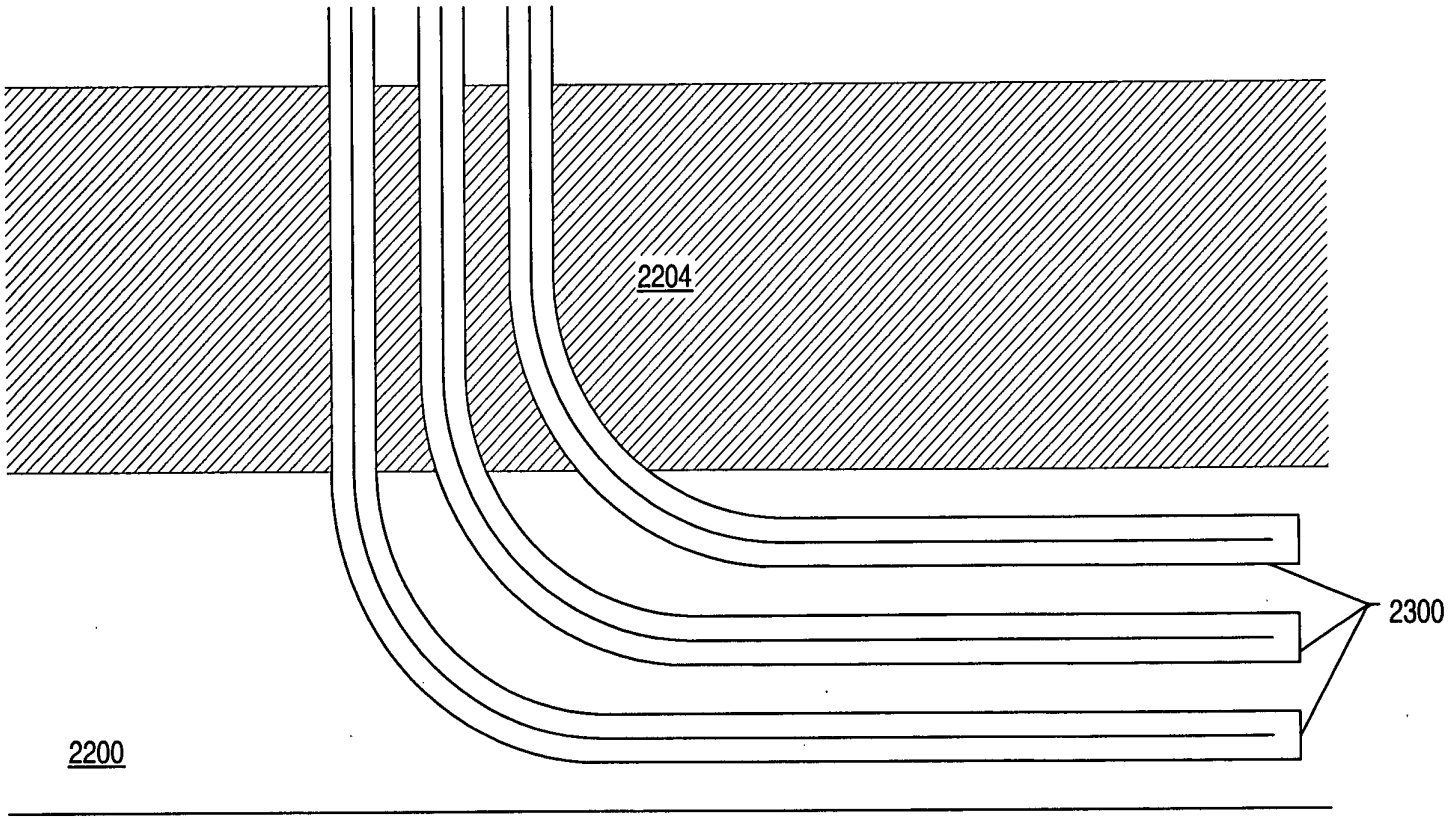


FIG. 47

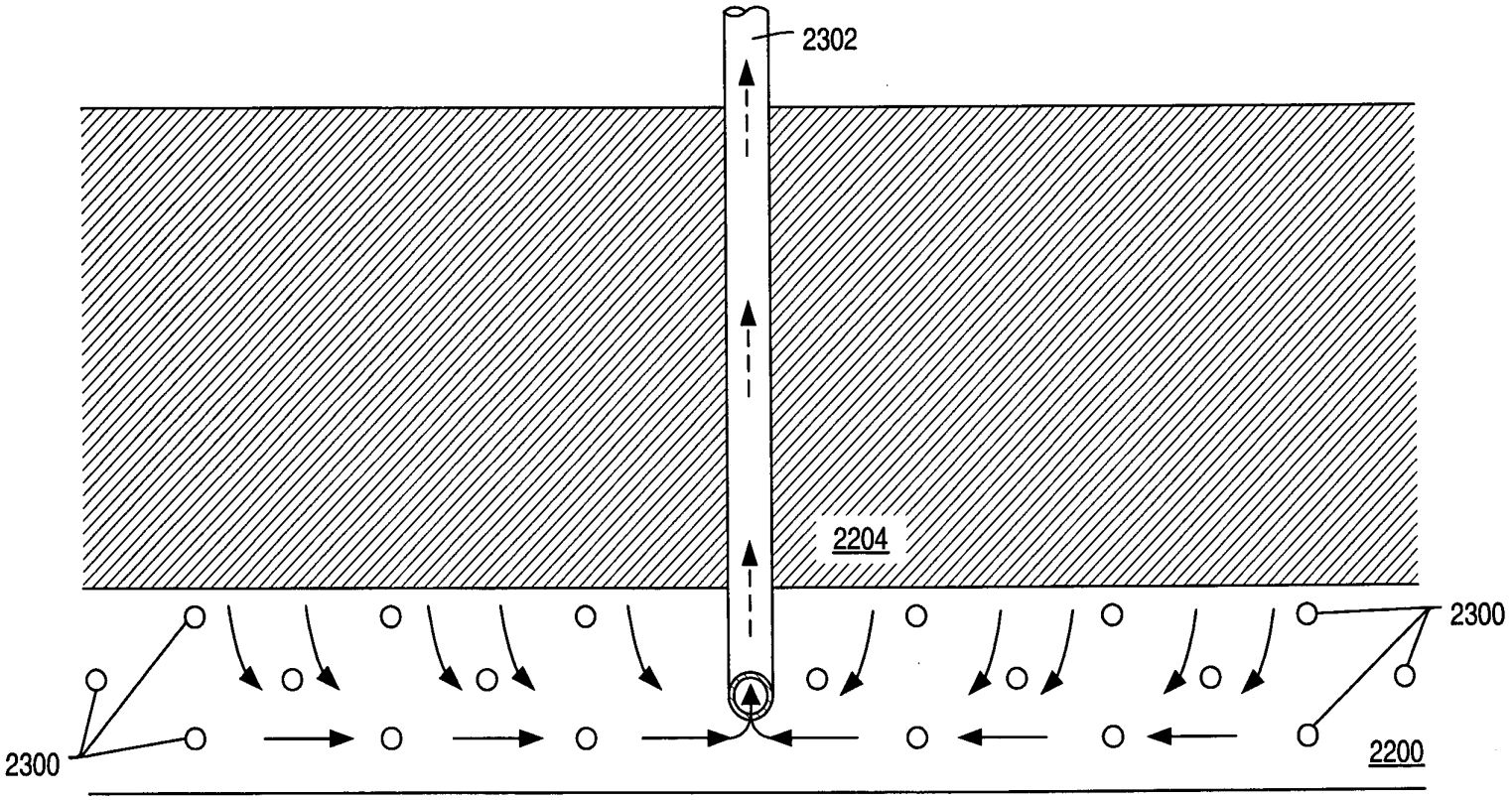
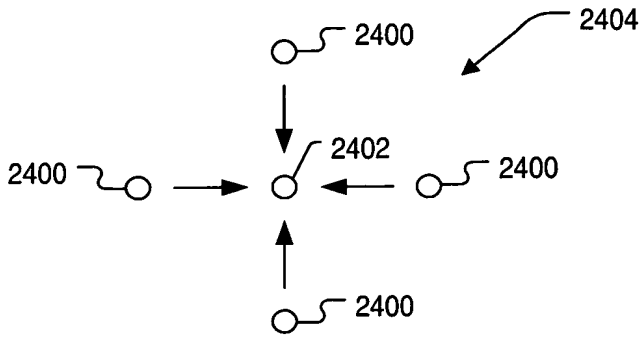


FIG. 48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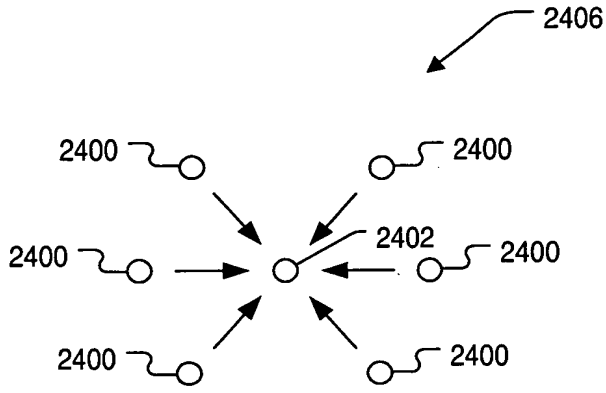
2400
2400
2400

FIG. 49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2402
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2400
2400
2400

FIG. 50

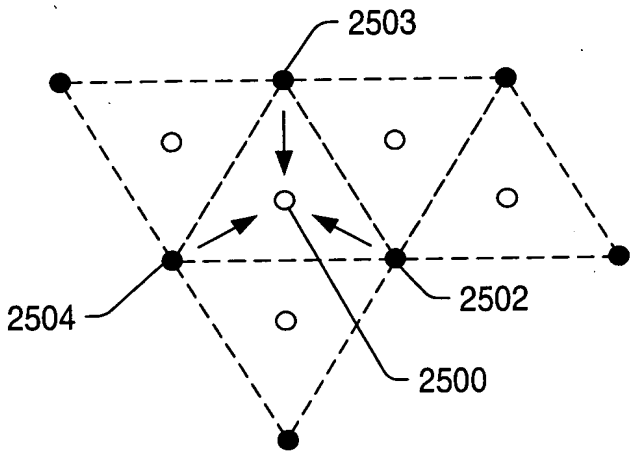


FIG. 51

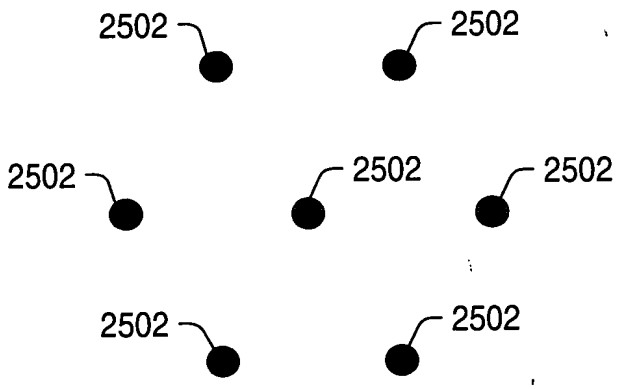
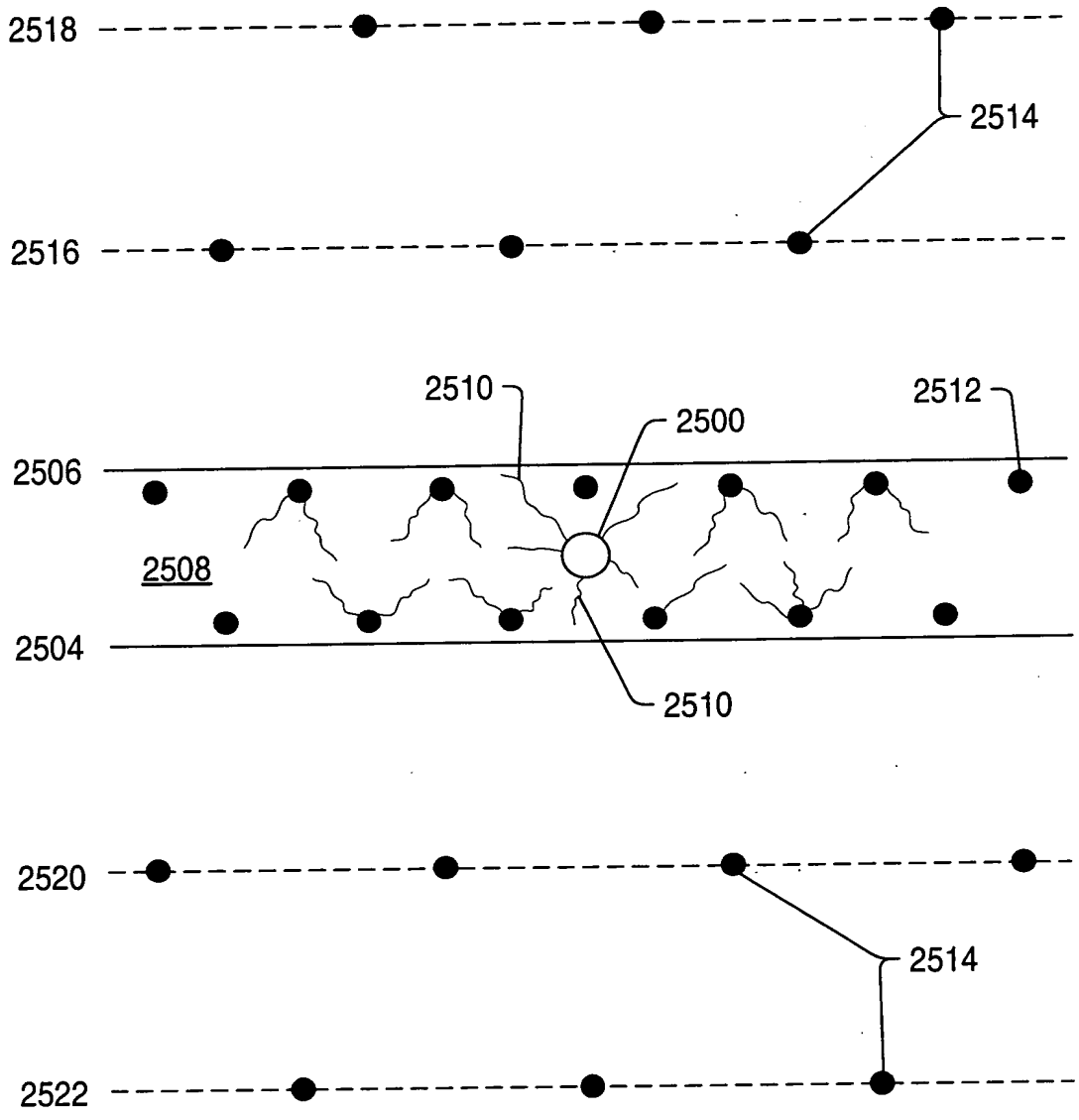


FIG. 52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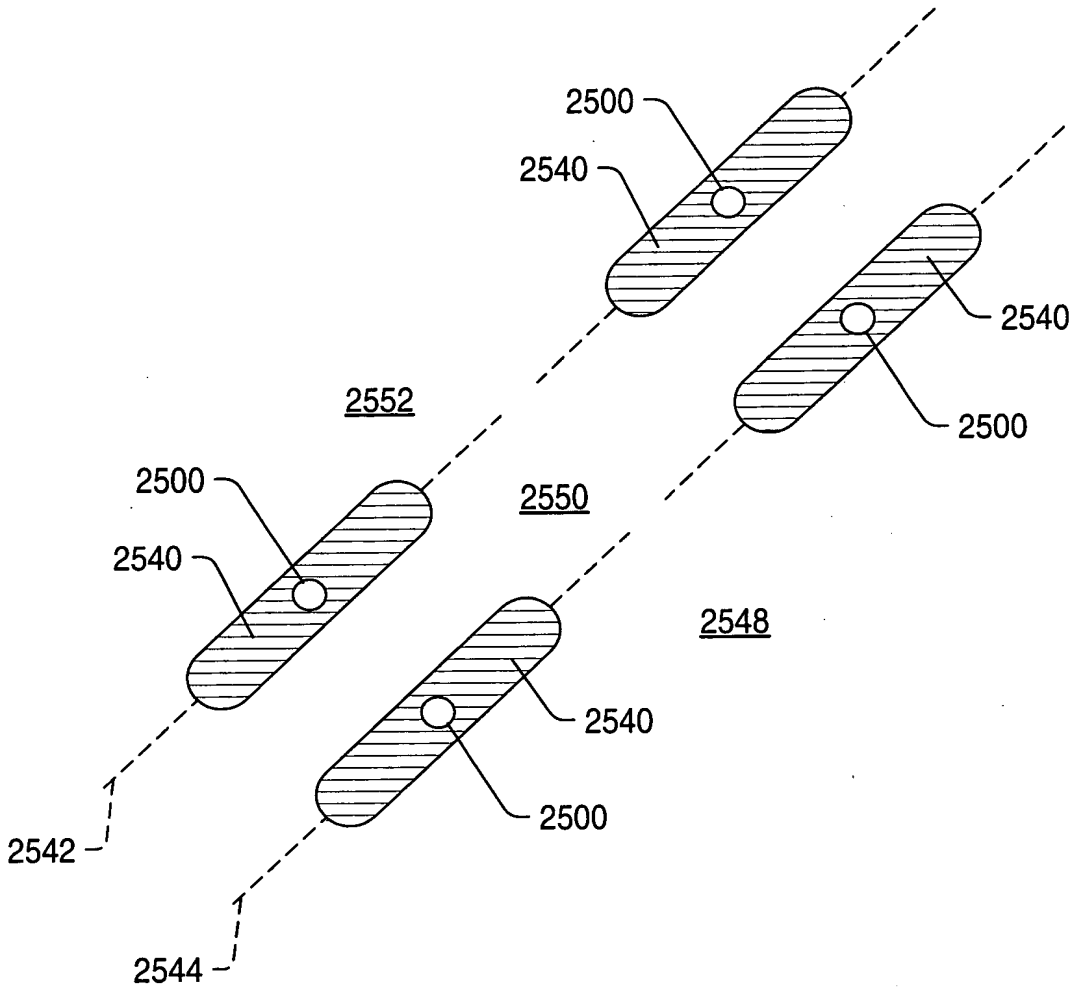
2506
2508
2504
2510
2520
2514
2522

FIG. 53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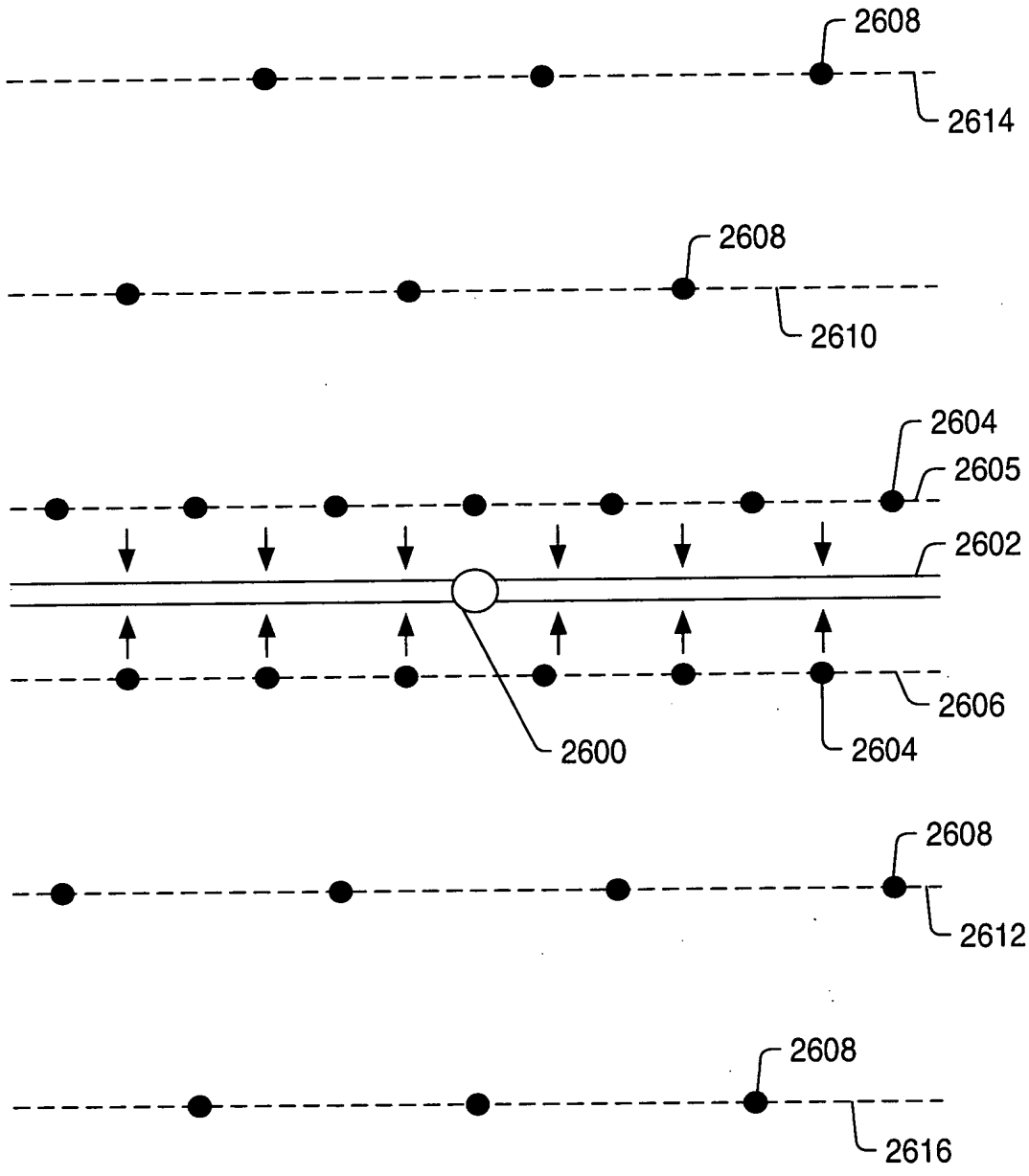
2548
2540
2500
2542
2544

FIG. 54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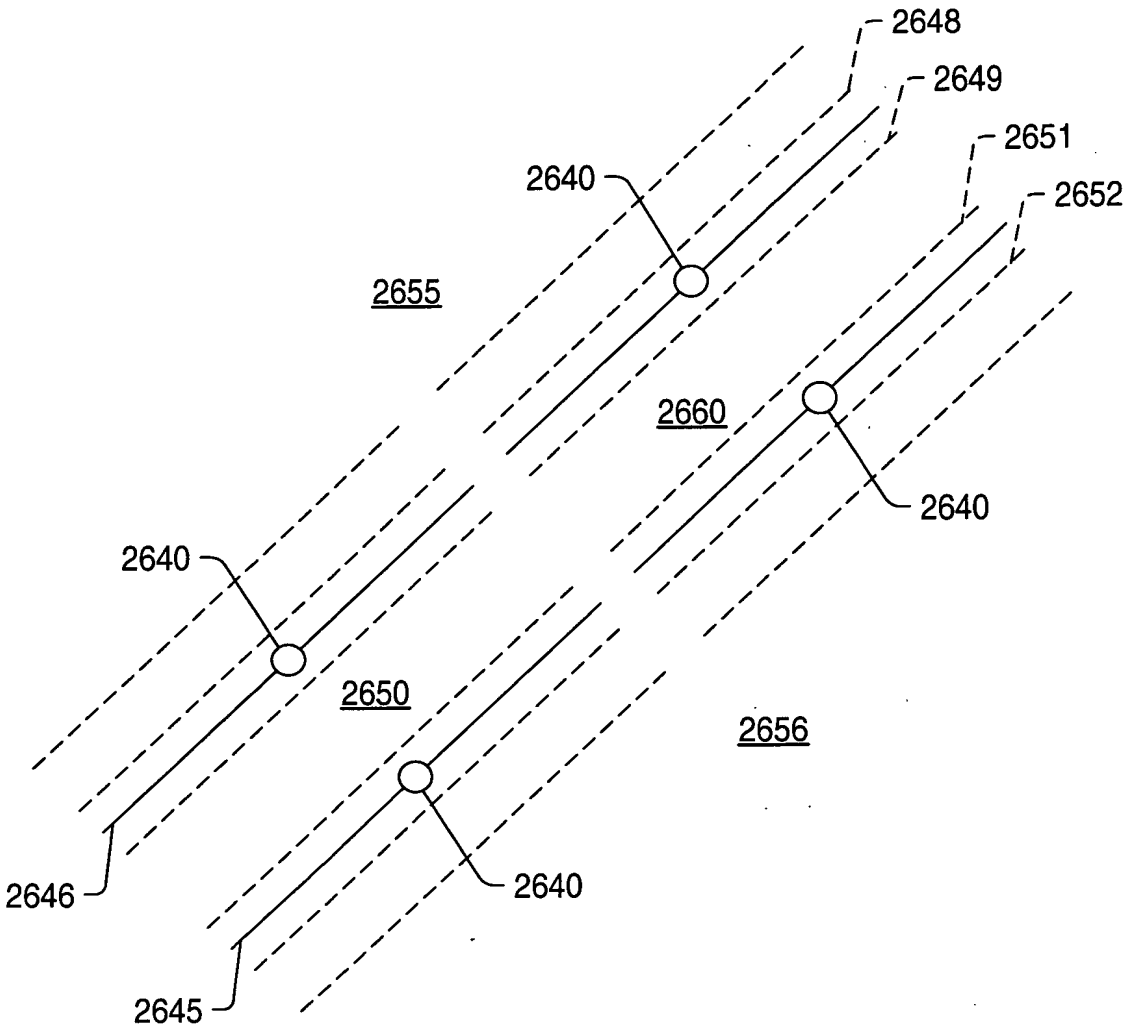
2600
2604
2608
2612
2608
2616

FIG. 55


2648
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2660
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2656
2646
2640
2645

FIG. 56

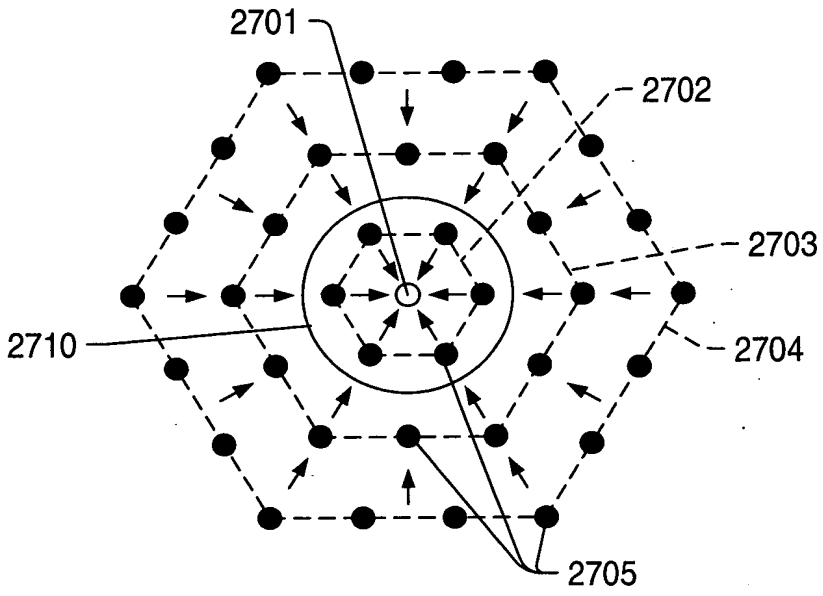


FIG. 57

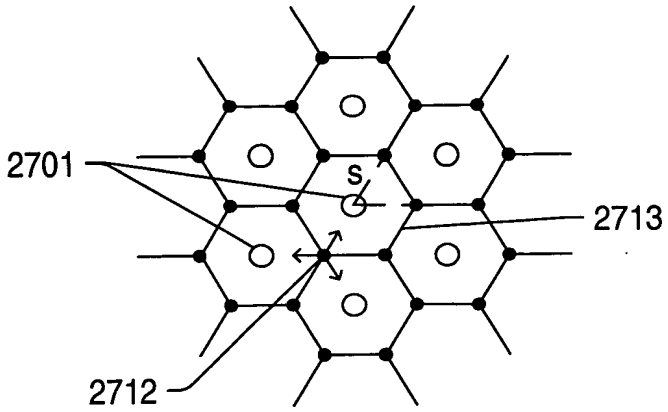


FIG. 58

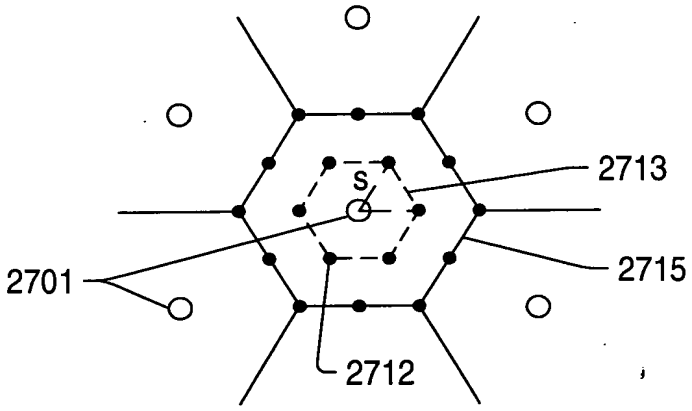


FIG. 59

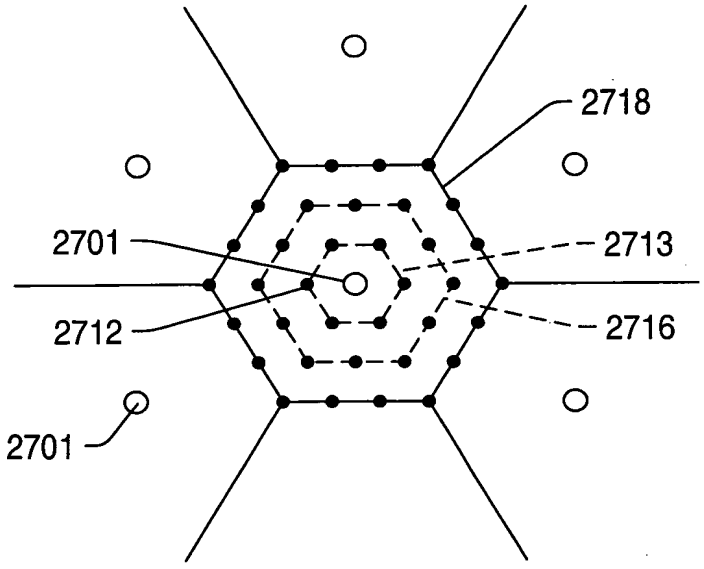


FIG. 60

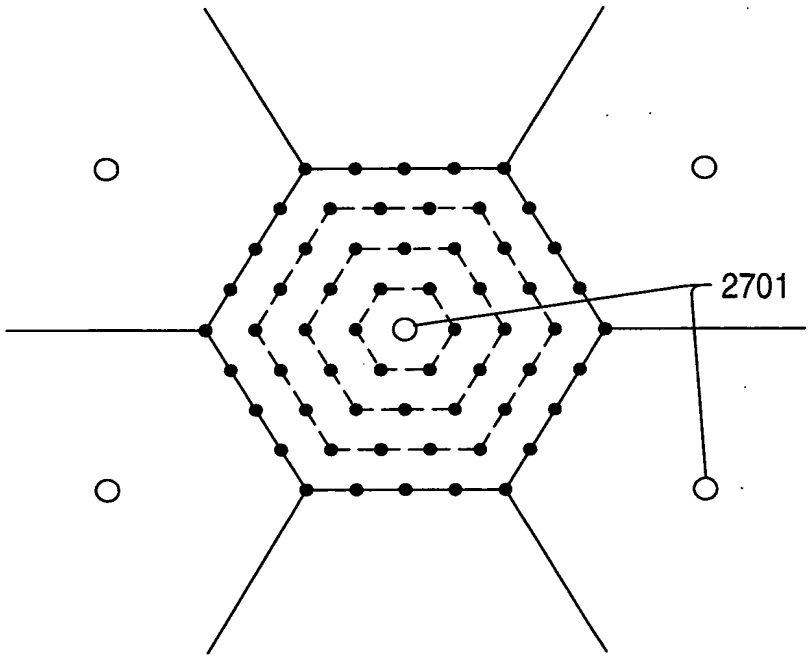


FIG. 61

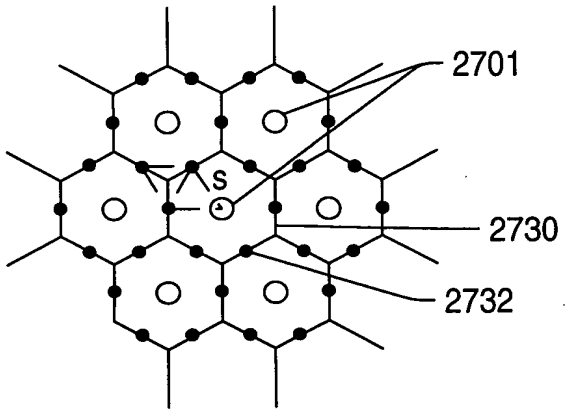


FIG. 62

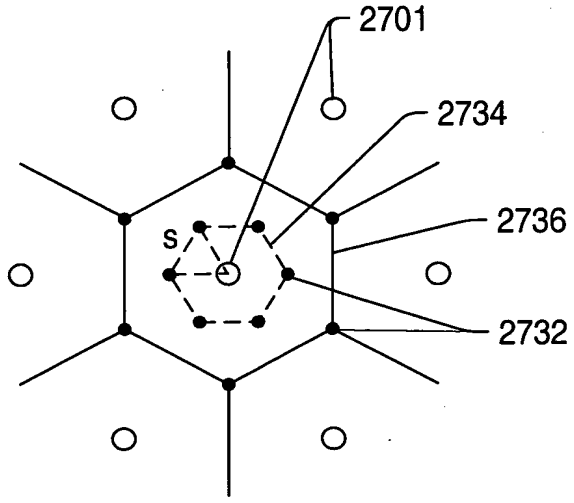


FIG. 63

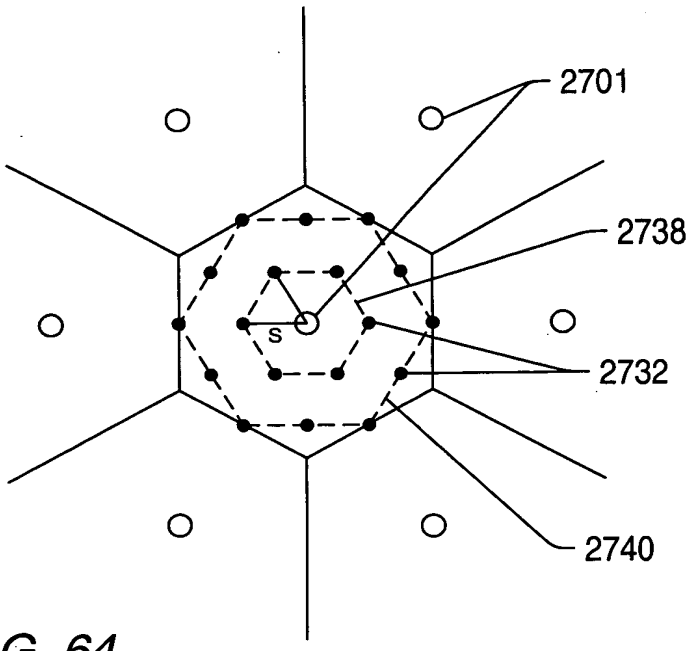


FIG. 64

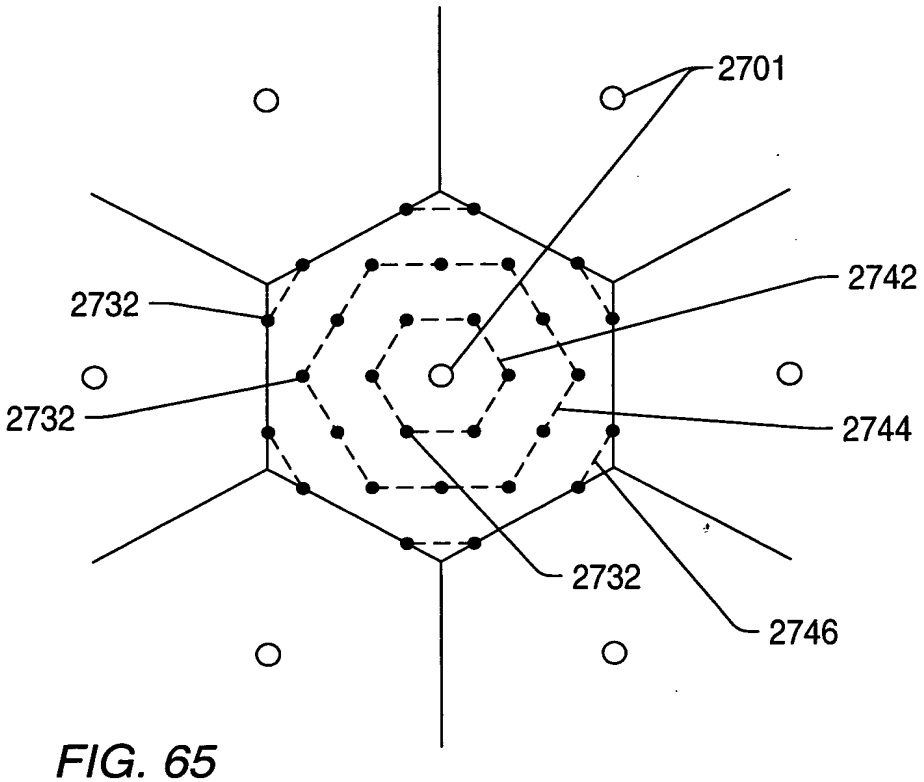


FIG. 65

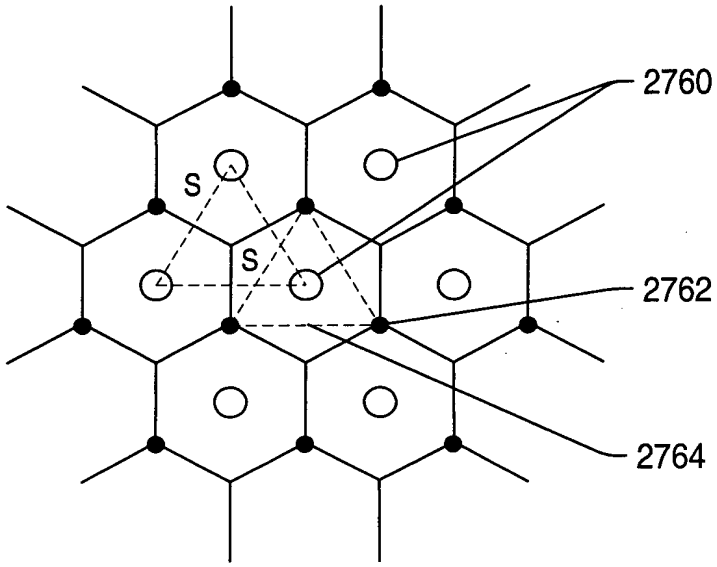


FIG. 66

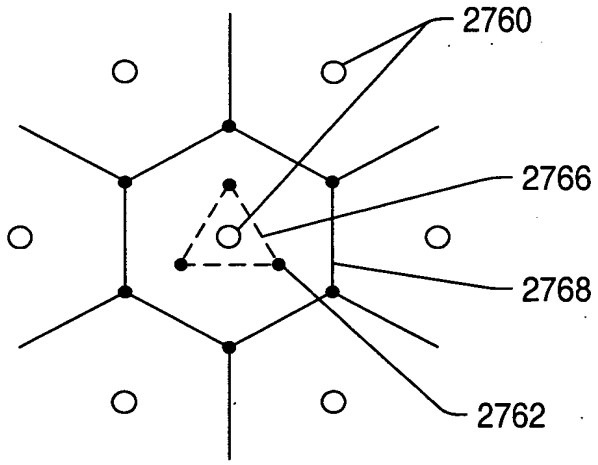


FIG. 67

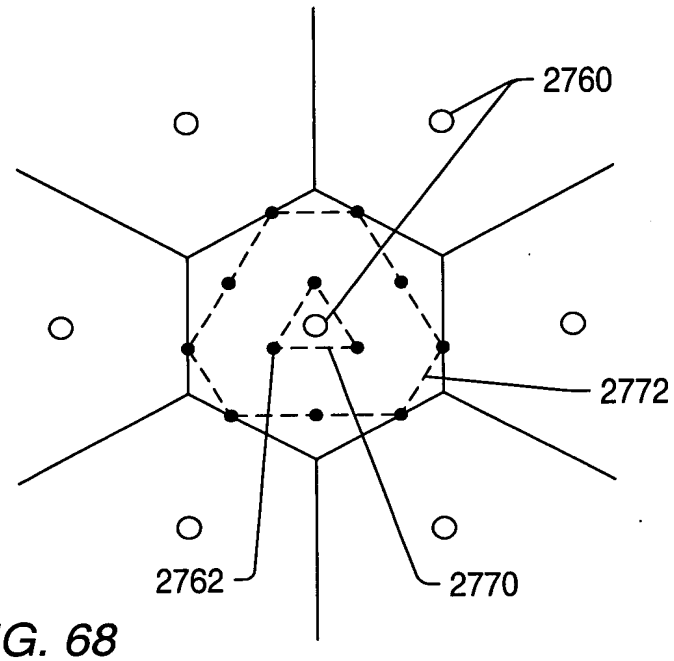


FIG. 68

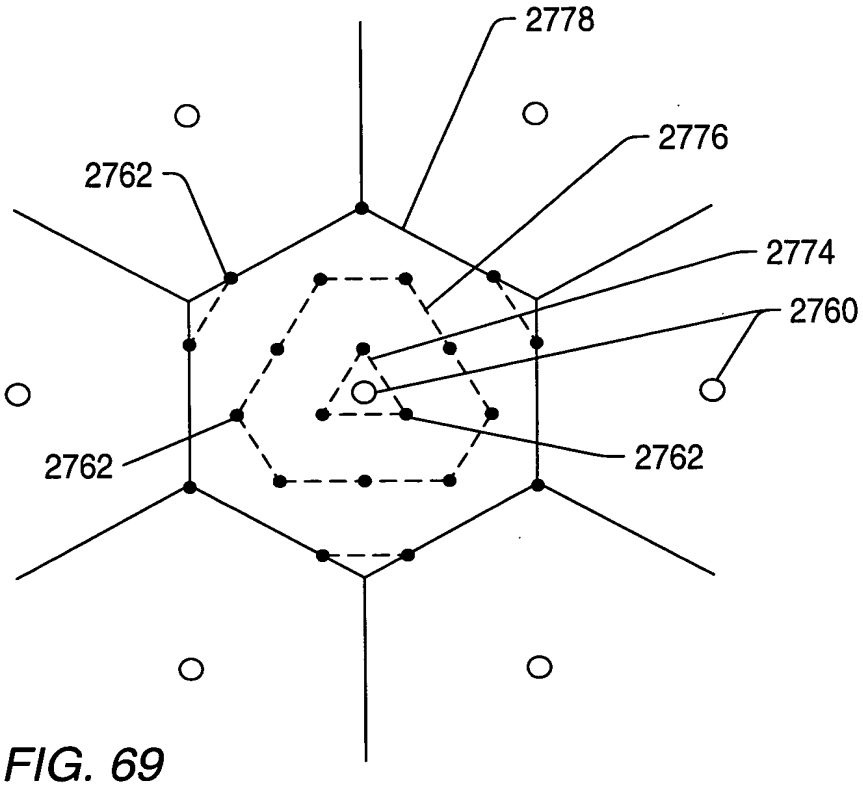


FIG. 69

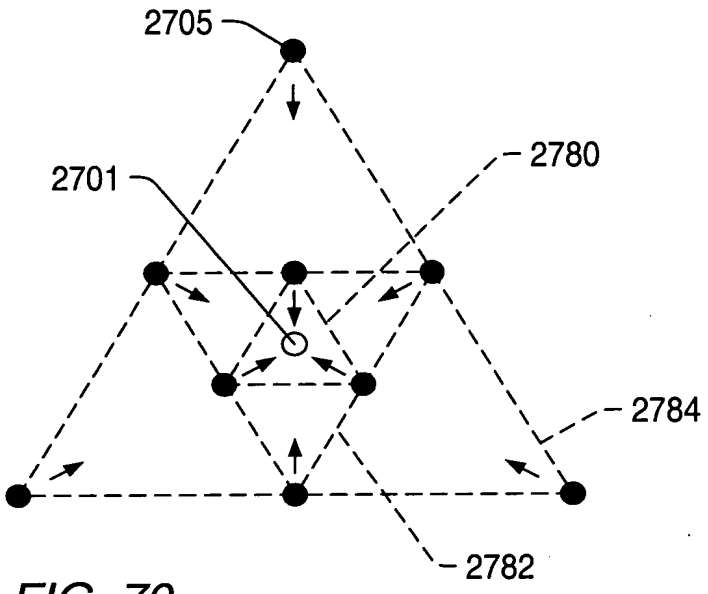
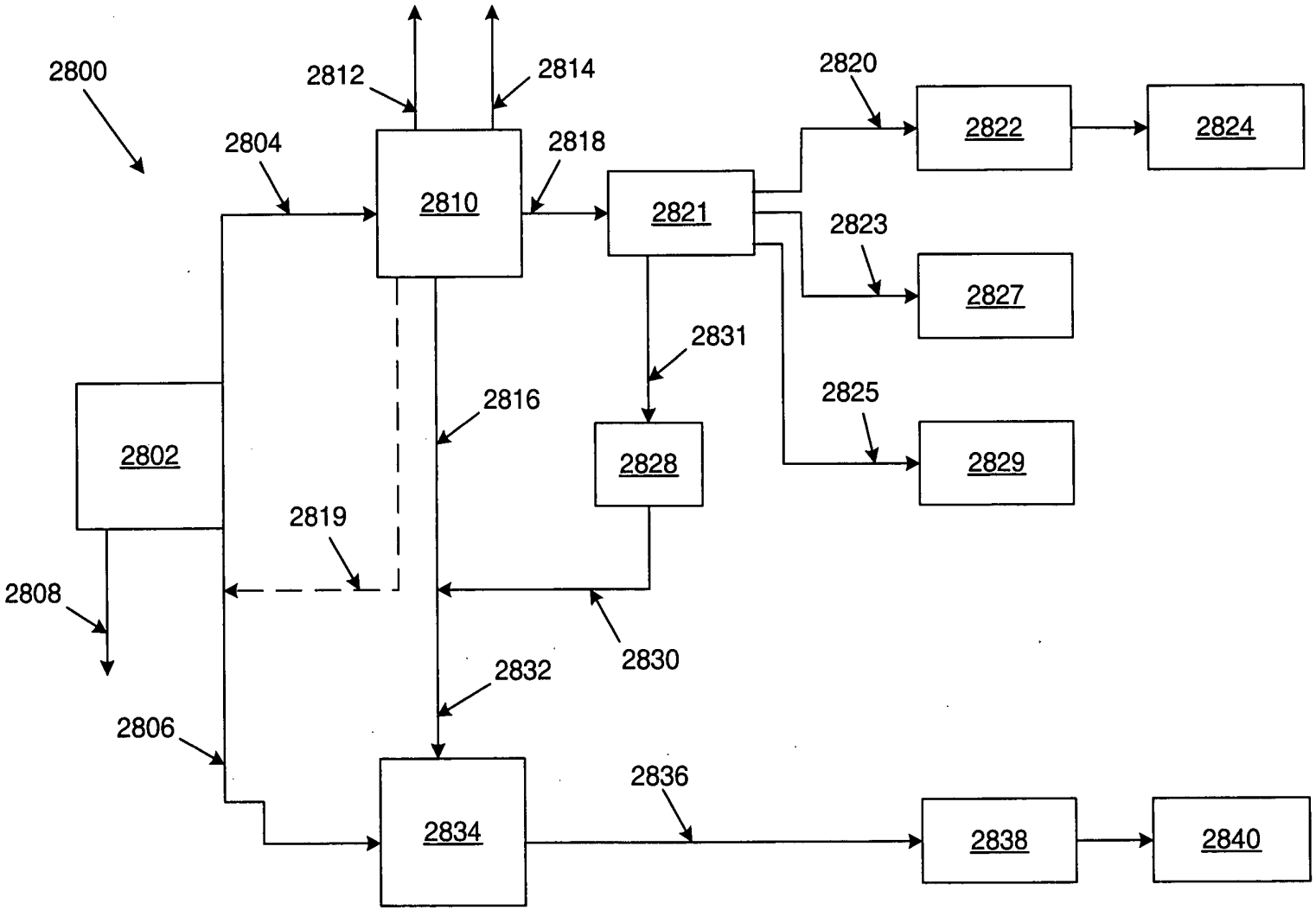


FIG. 70


2800
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2840

Fig. 71

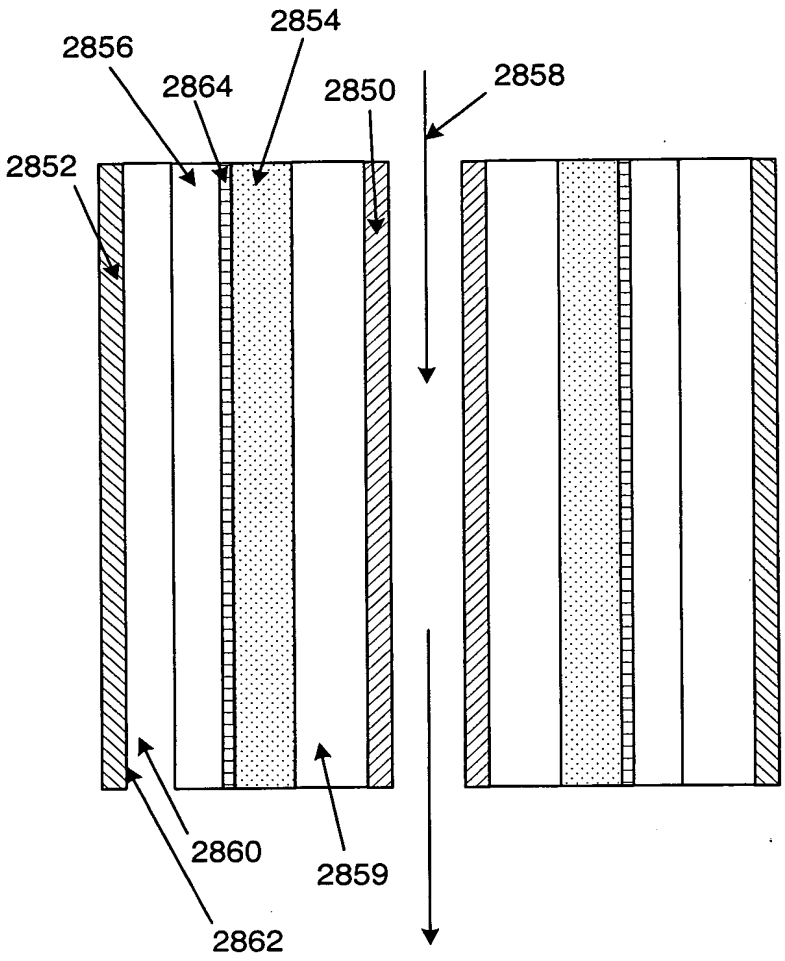


Fig. 72

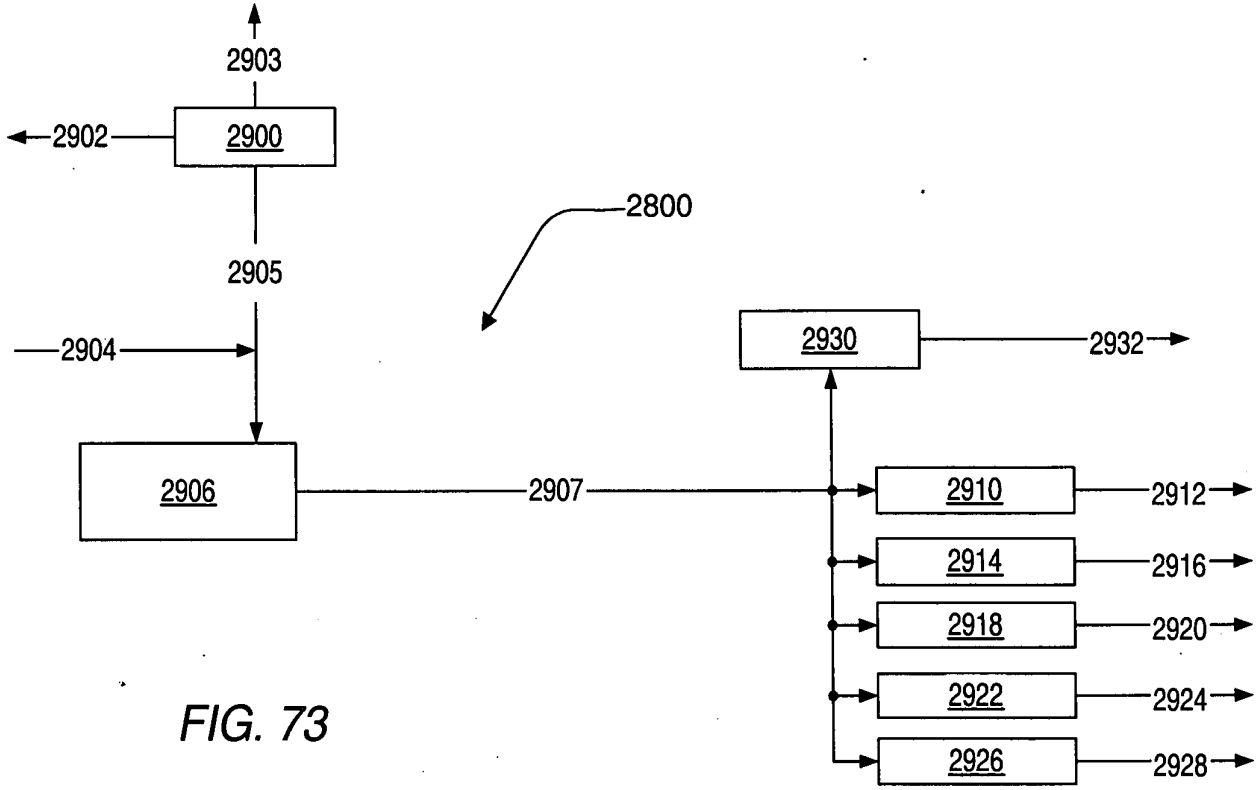


FIG. 73

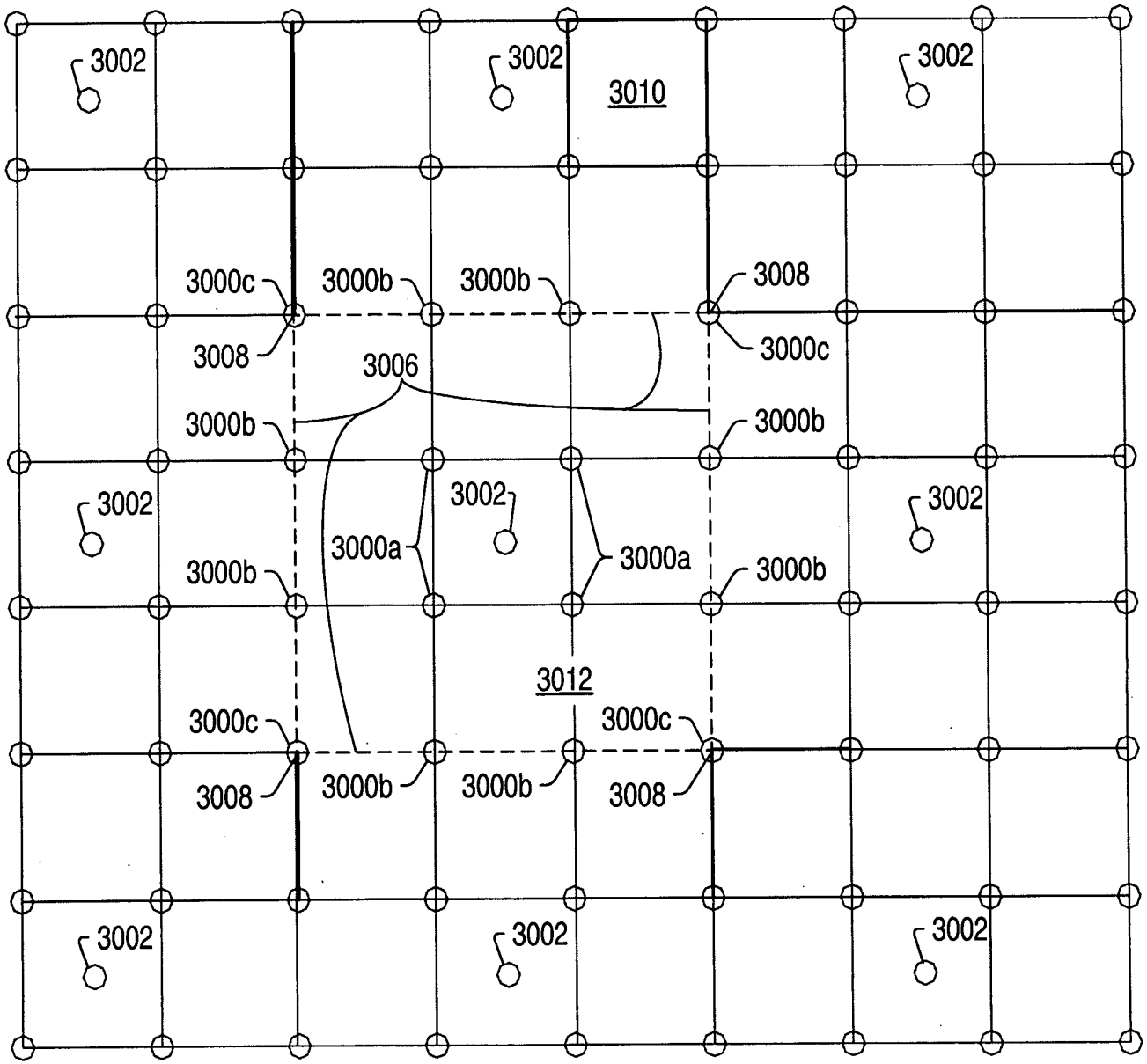
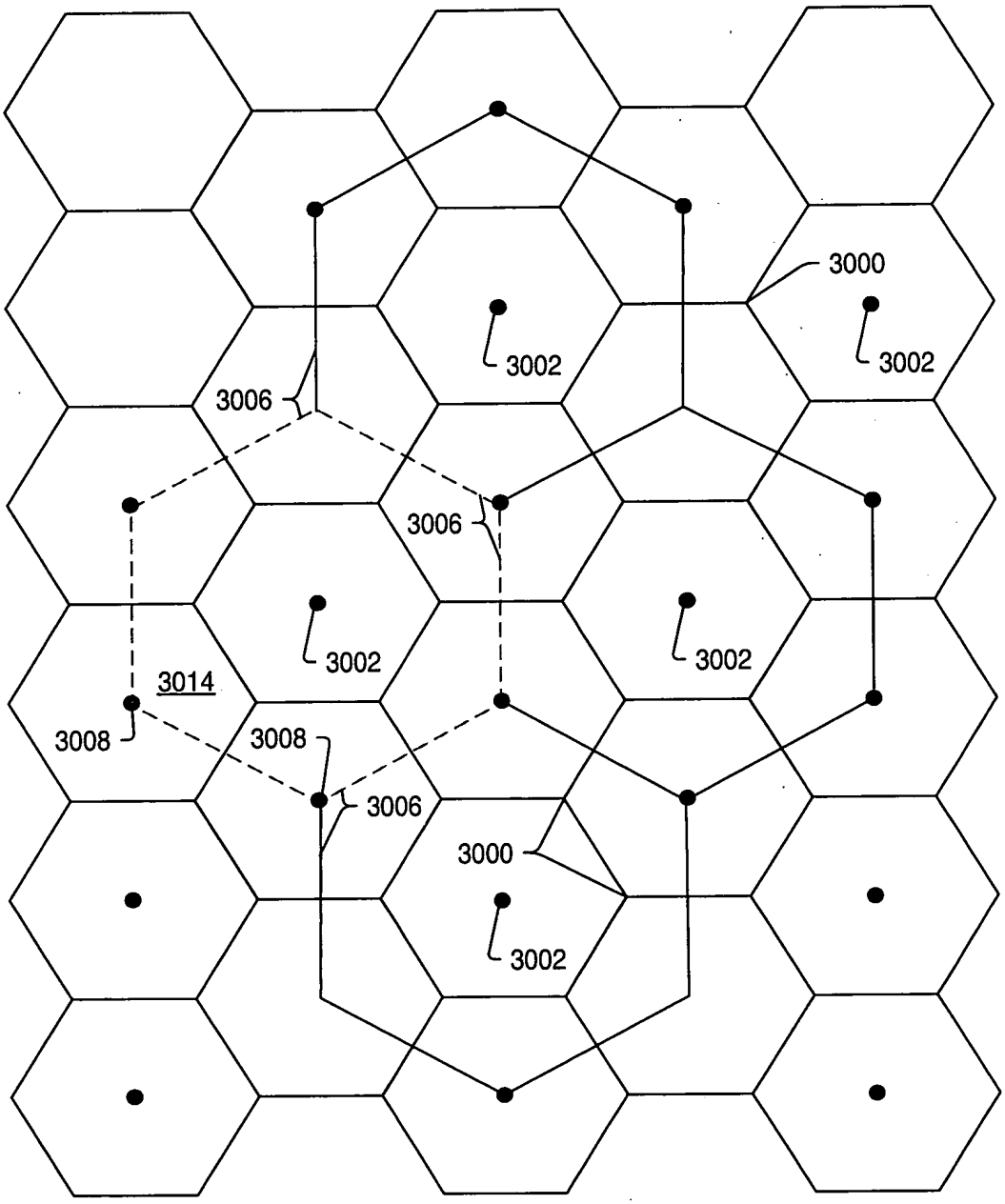

3002
3002
3010
3002
3000c
3000b
3000b
3008
3008
3000c
3006
3000b
3000b
3002
3002
3002
3000a
3000a
3000b
3000b
3012
3000c
3000c
3008
3000b
3000b
3008
3002
3002
3002

FIG. 74


3000
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3002
3006
3006
3002
3002
3014
3008
3008
3006
3000
3002

FIG. 75

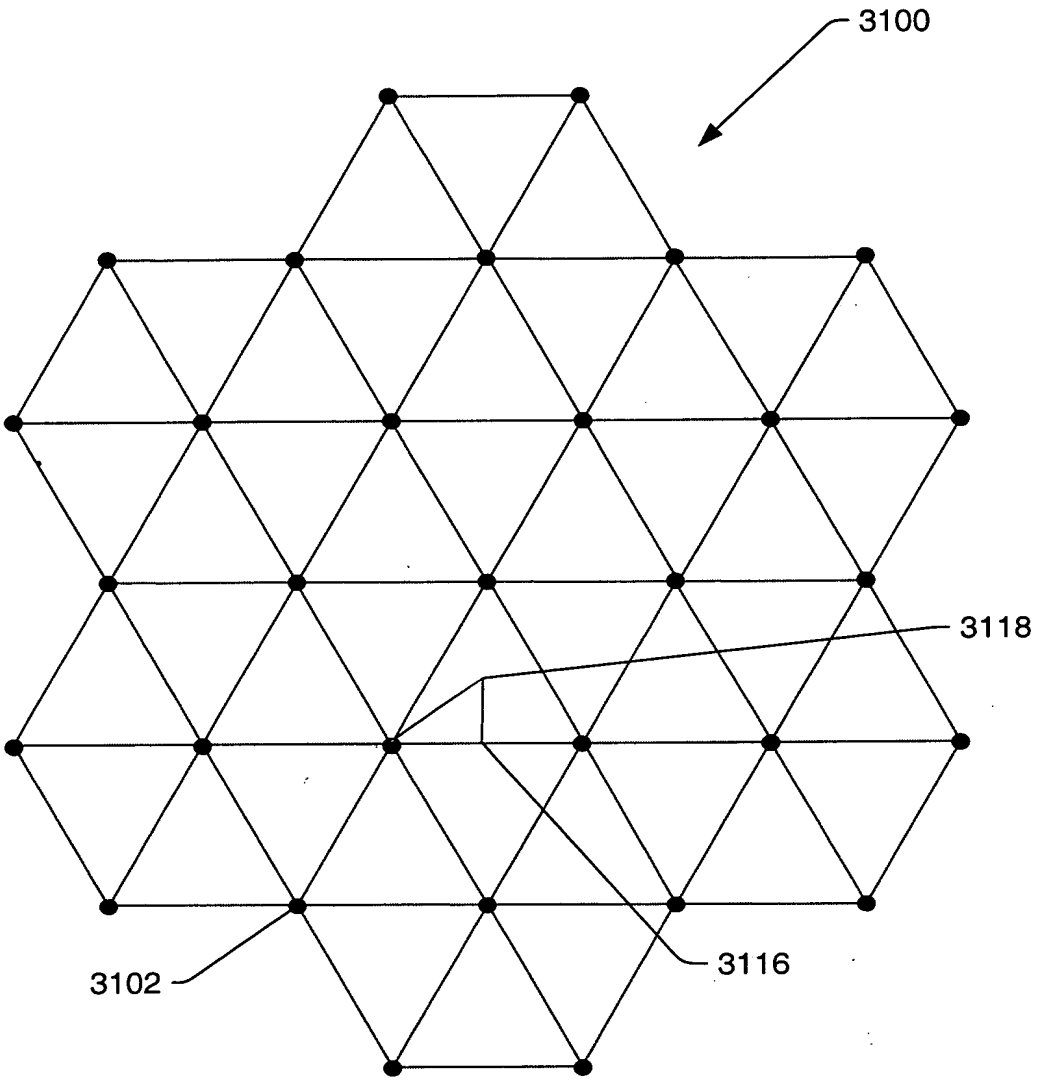


FIG. 76

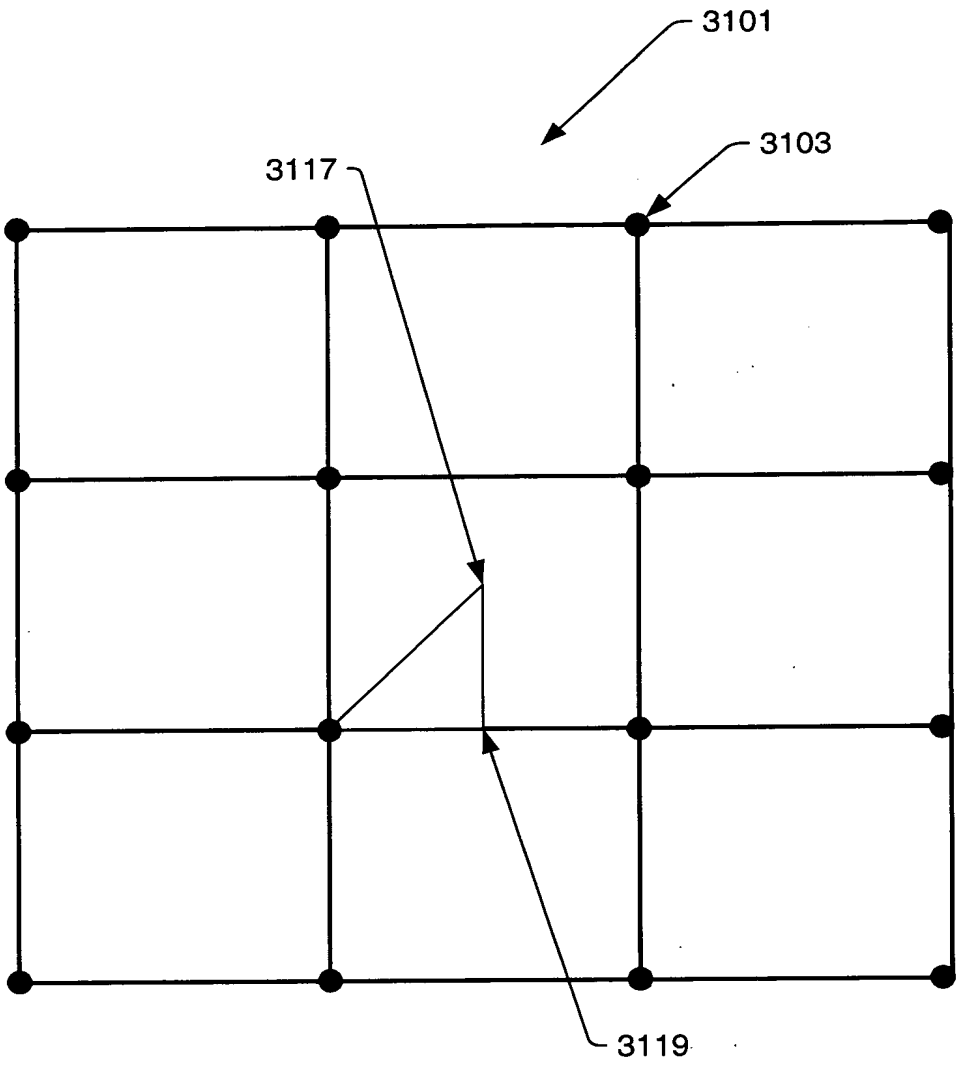


FIG. 76a

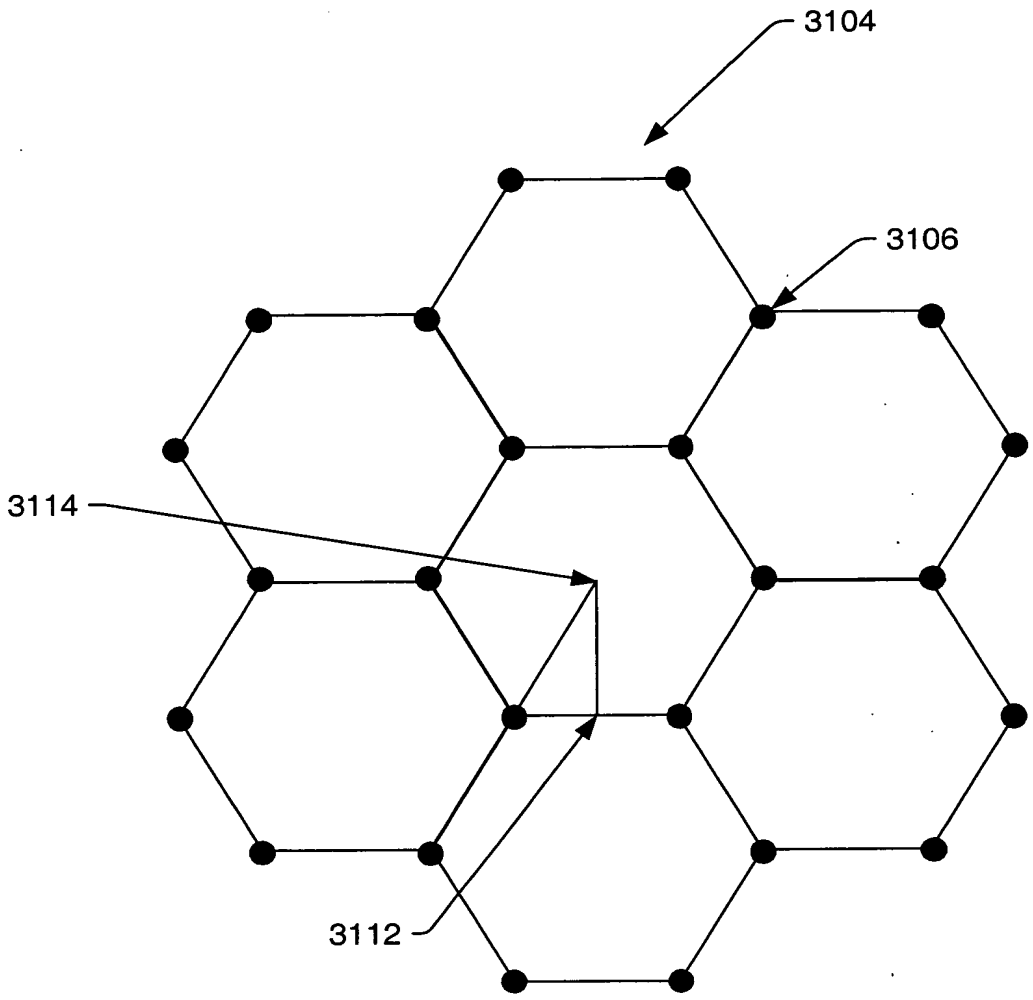


FIG. 77

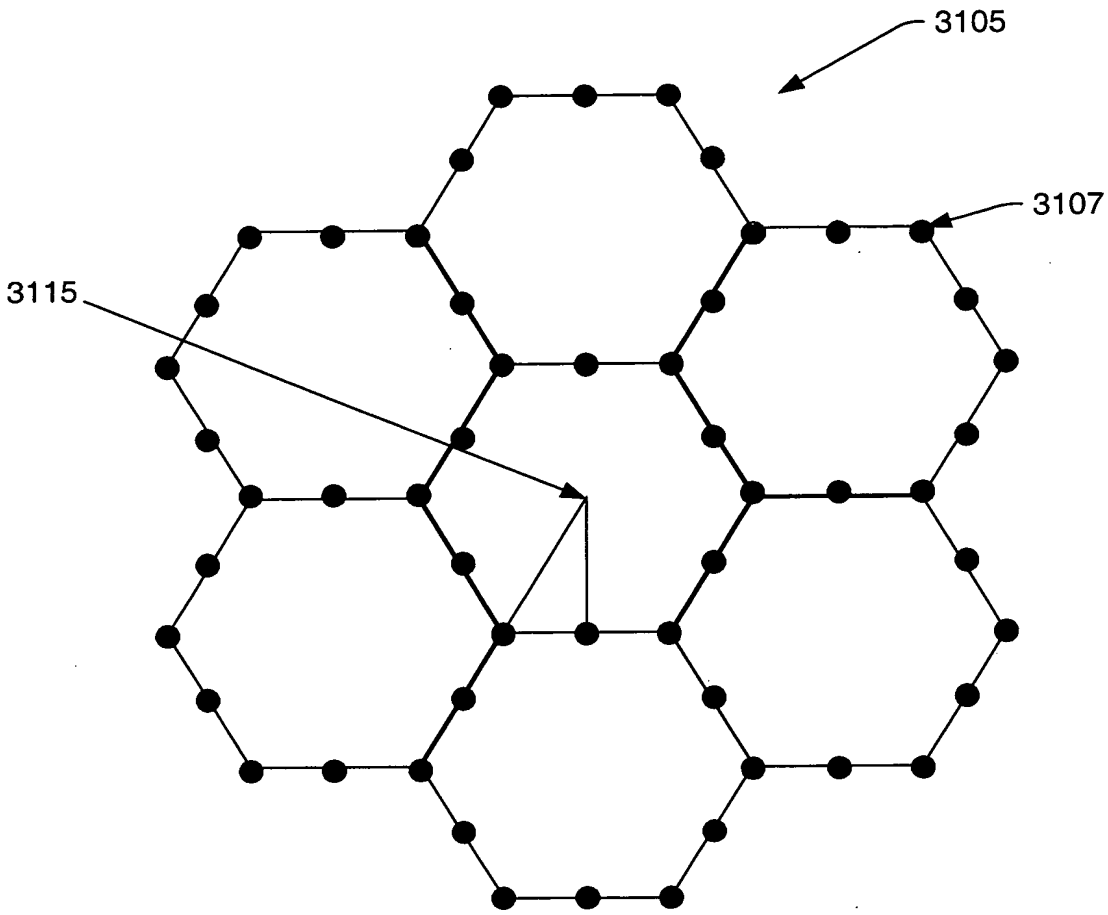


FIG. 77a

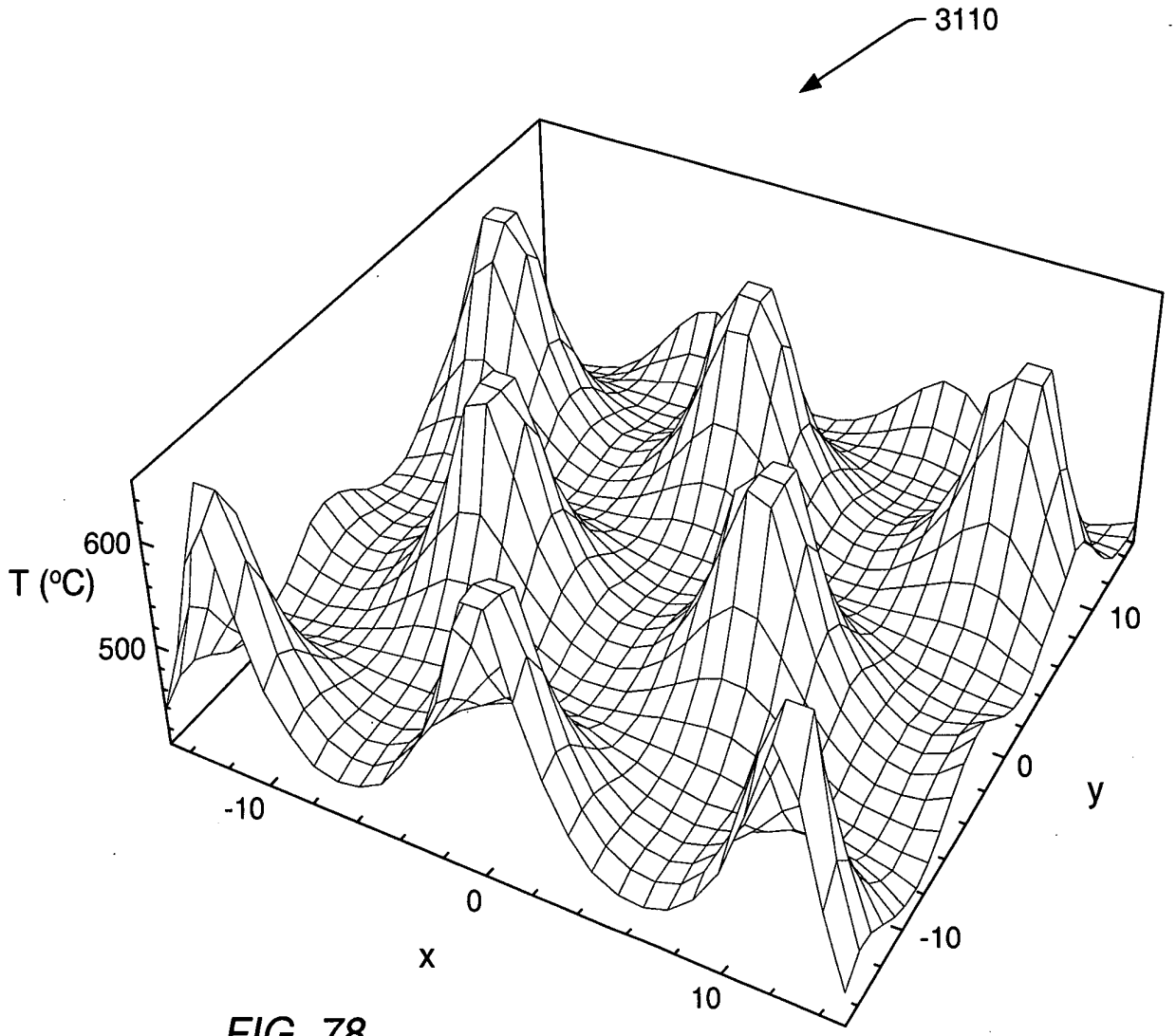


FIG. 78

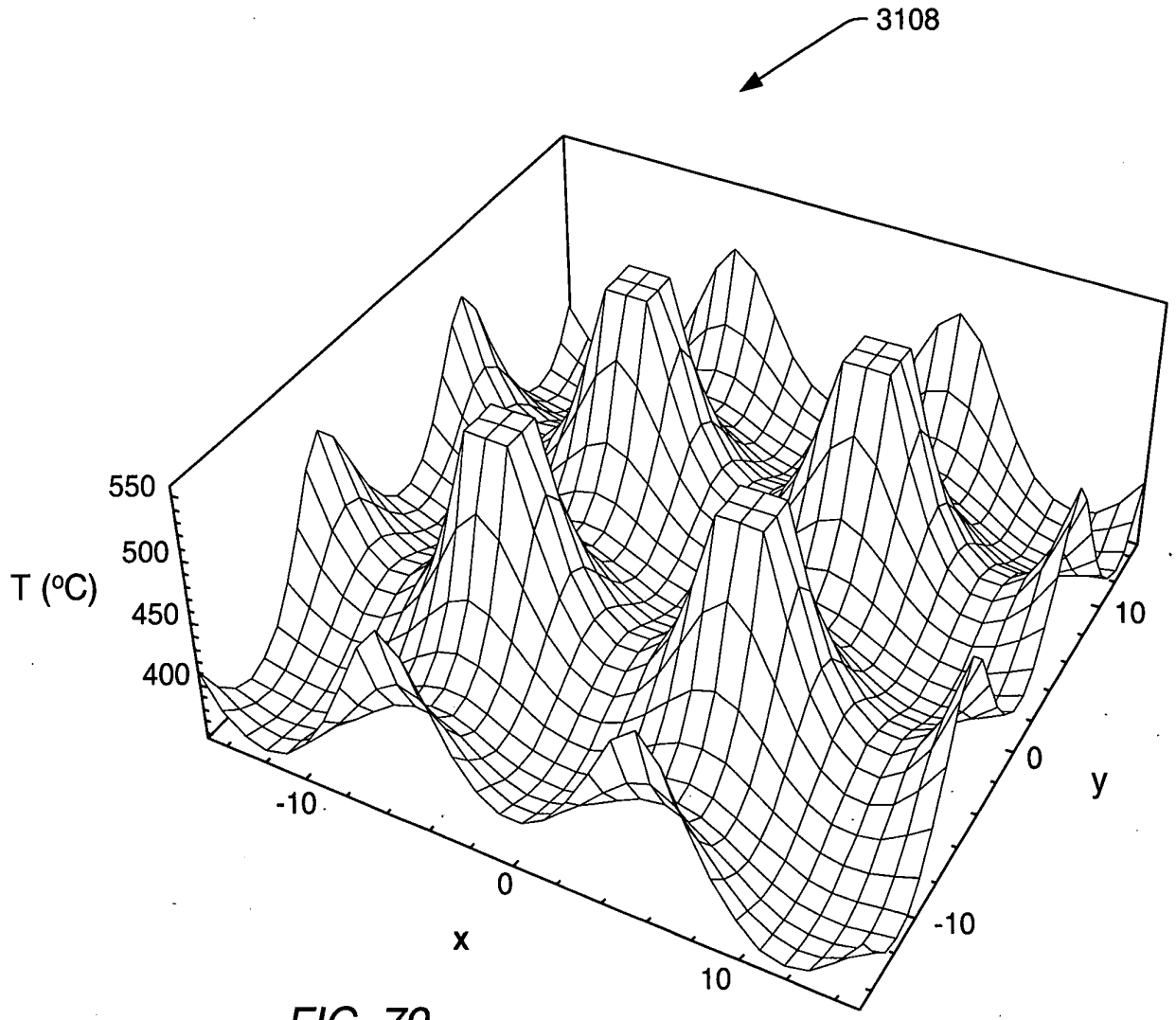


FIG. 79

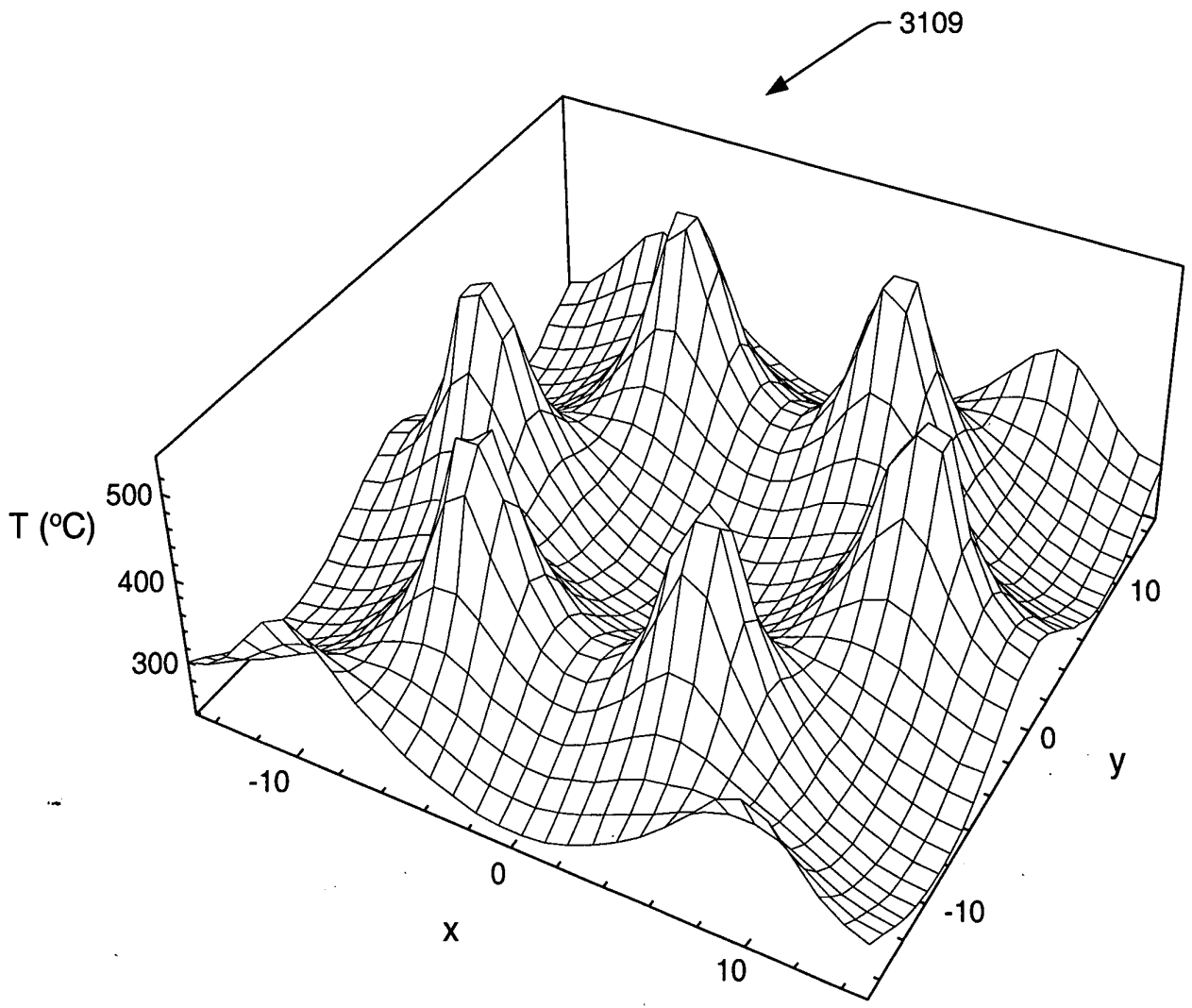


FIG. 79a

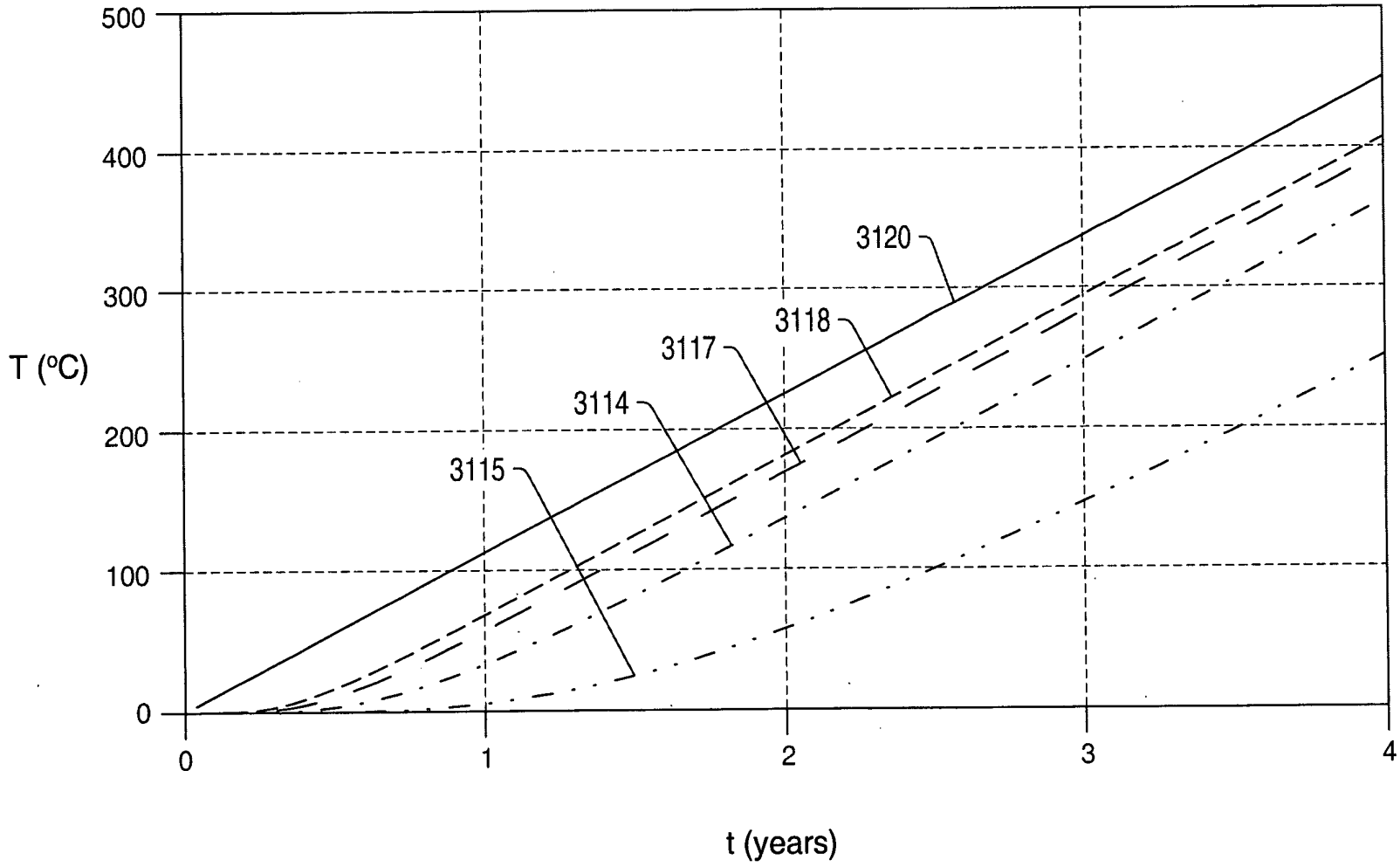


FIG. 80

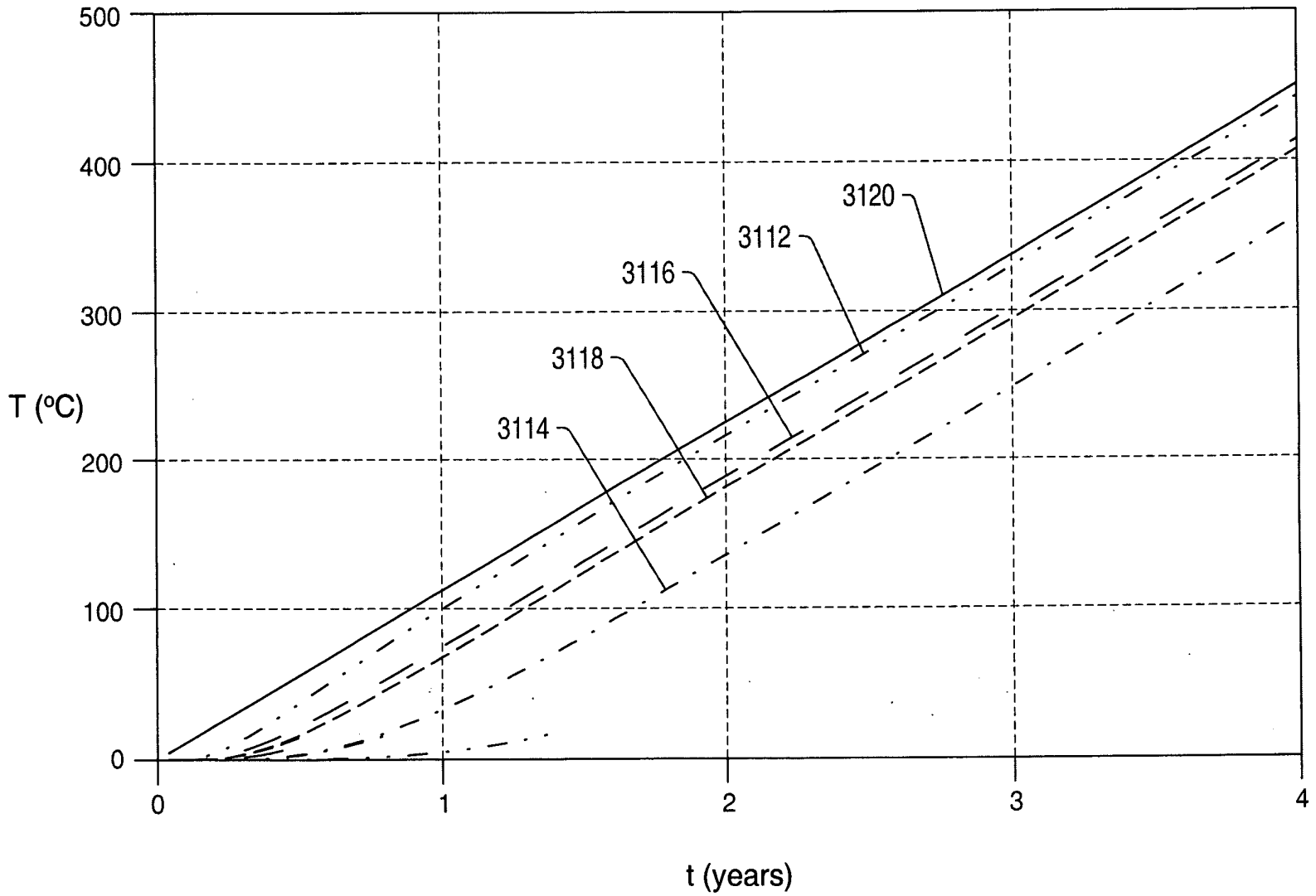


FIG. 81

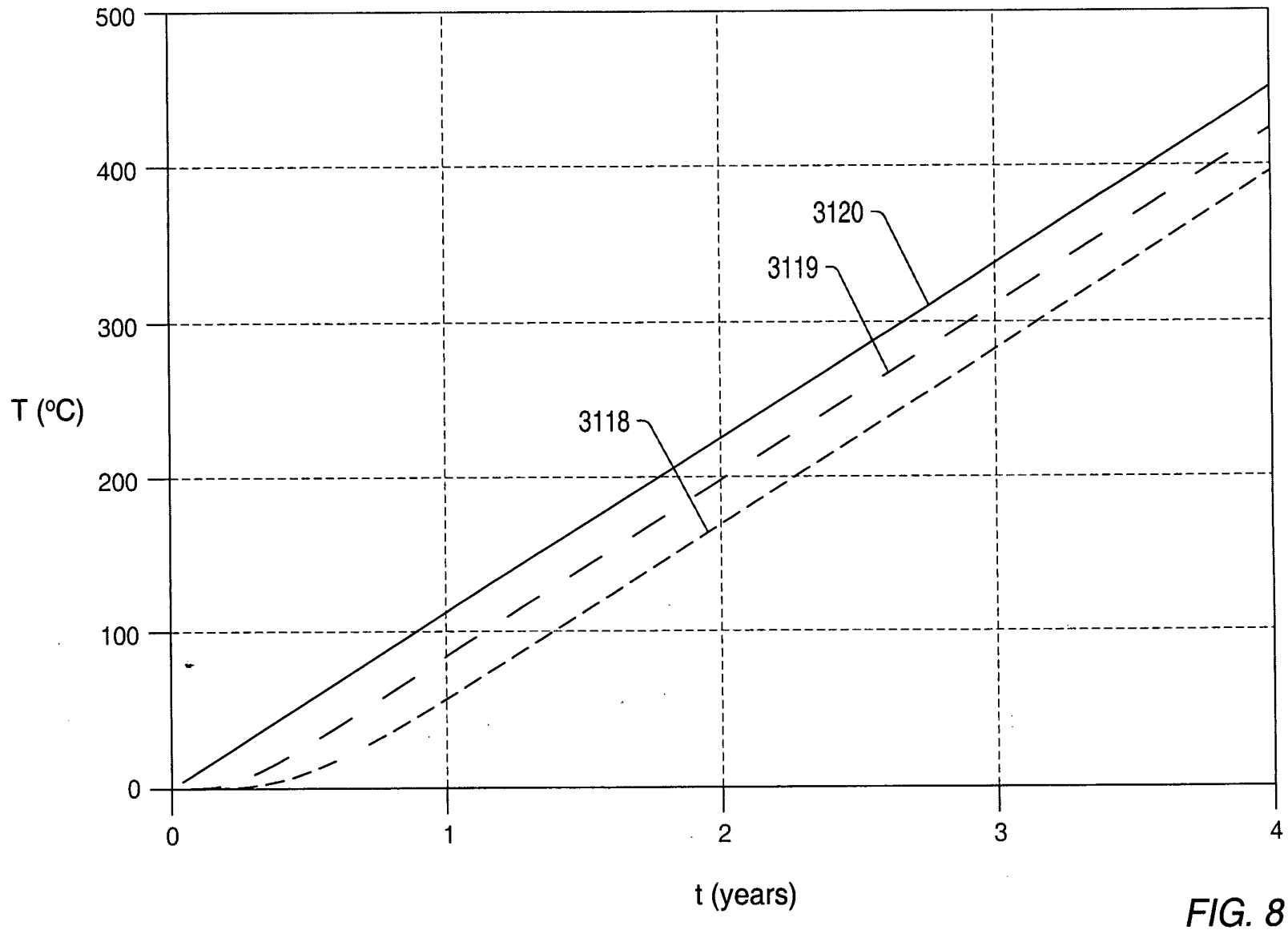


FIG. 81a

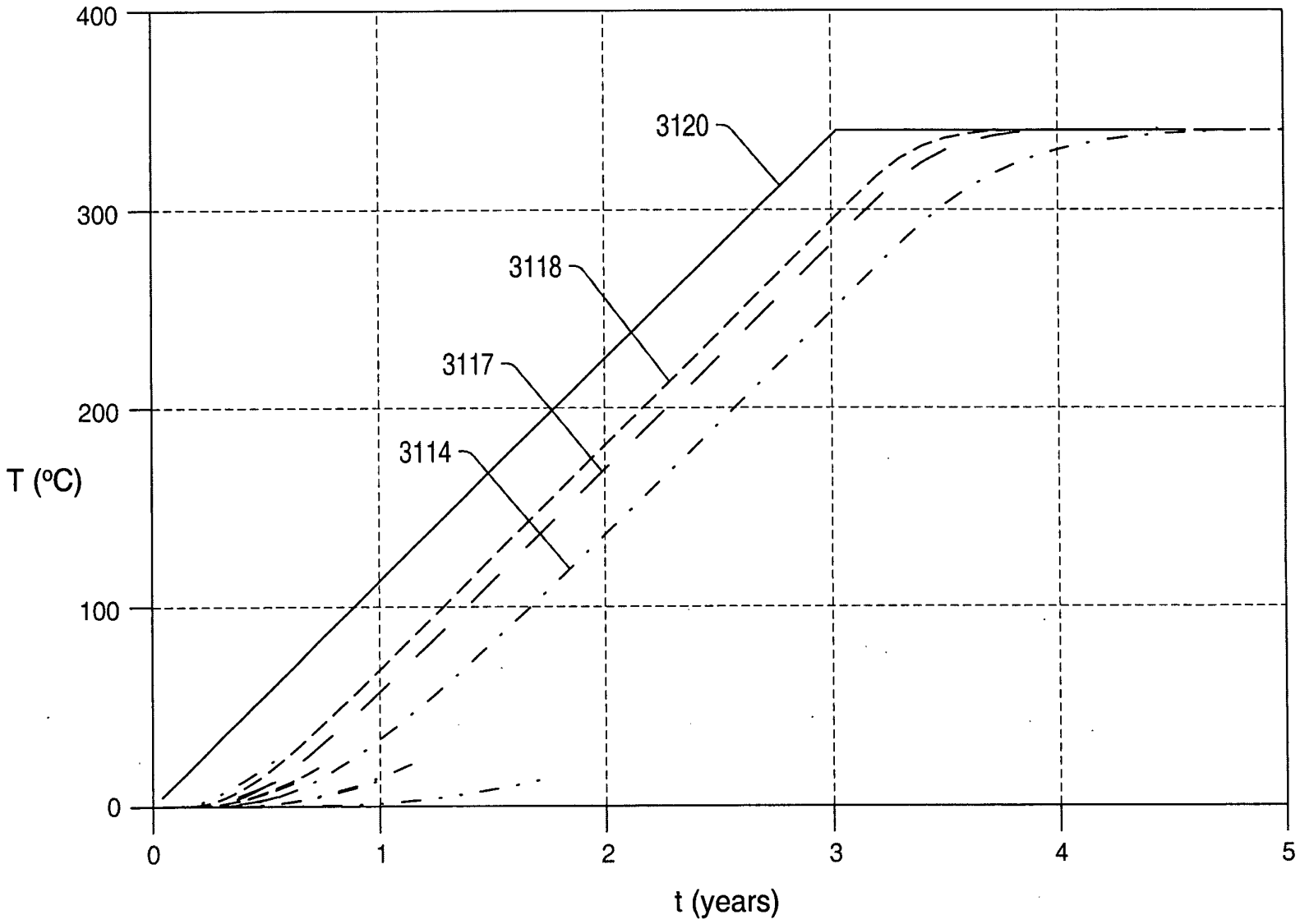


FIG. 81b

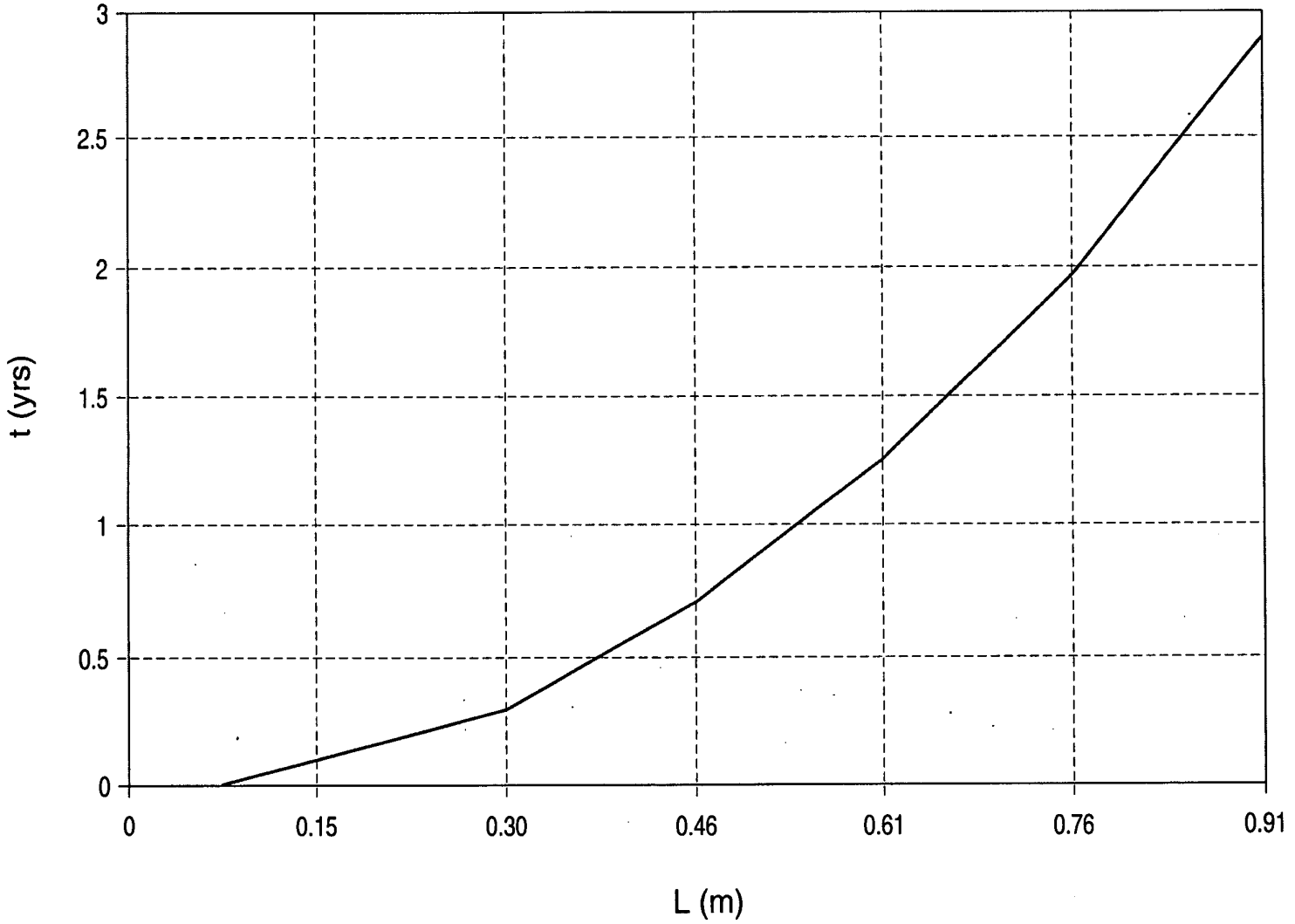


FIG. 82

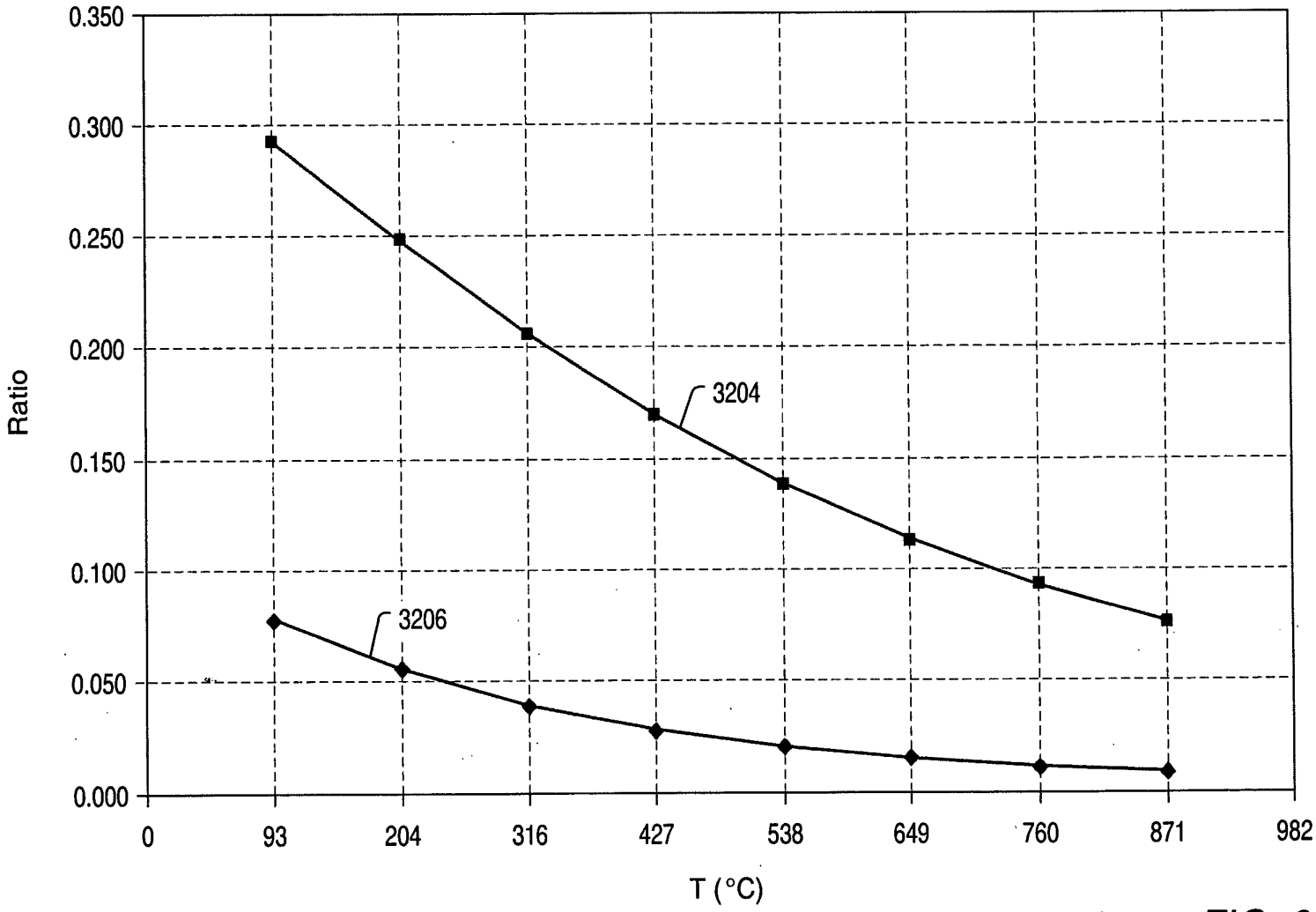

0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Ratio
3204
3206
0
93
204
316
427
538
649
760
871
982
T (°C)

FIG. 83

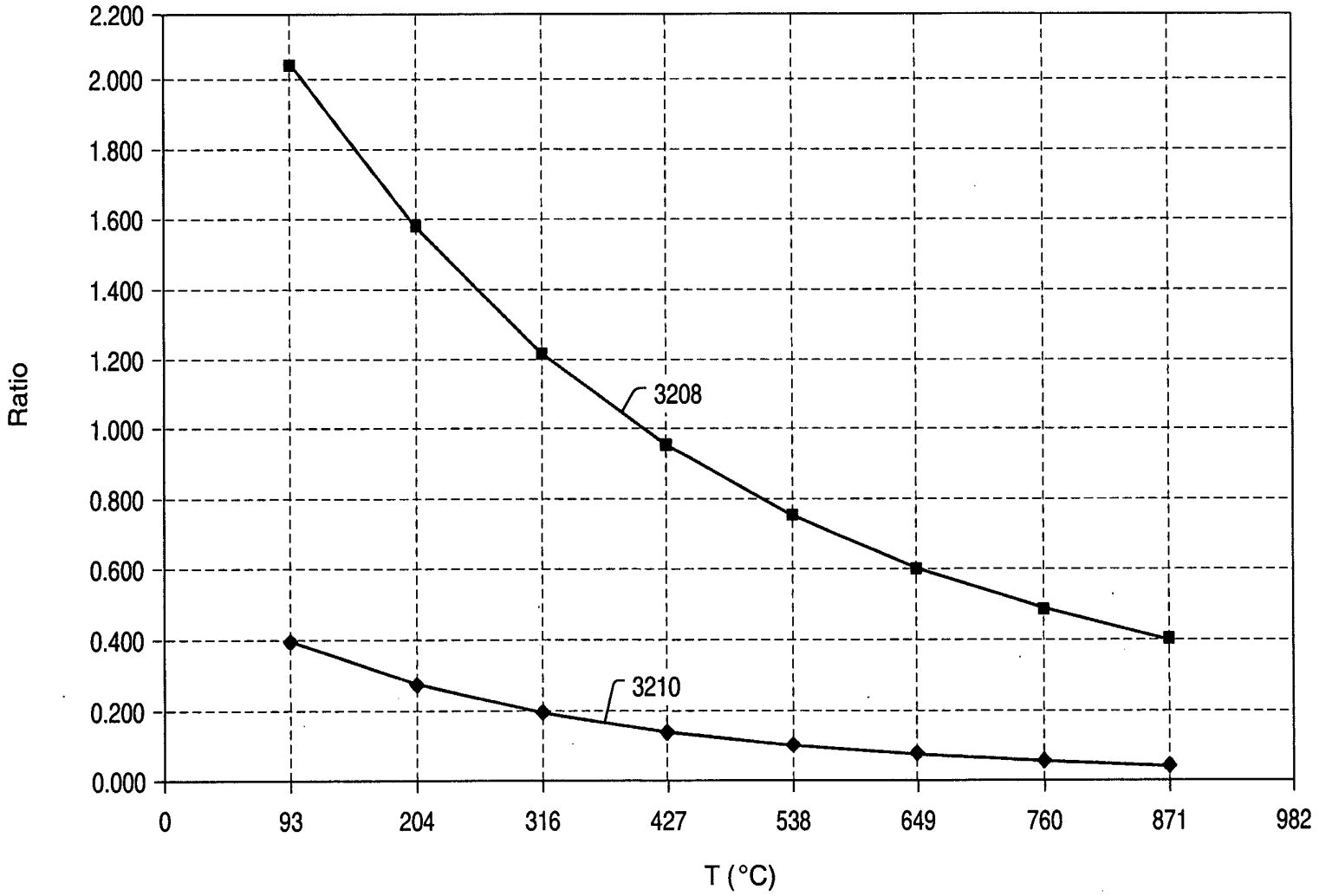

2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Ratio
3208
3210
0
93
204
316
427
538
649
760
871
982
T (°C)

FIG. 84

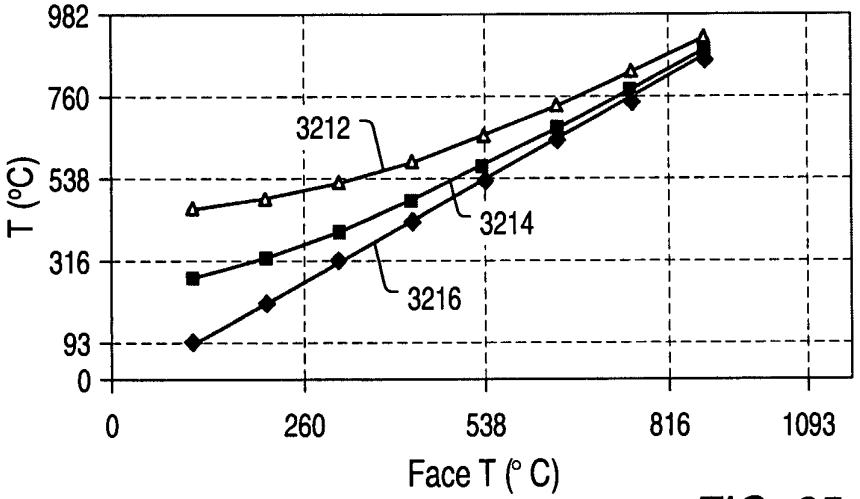


FIG. 85

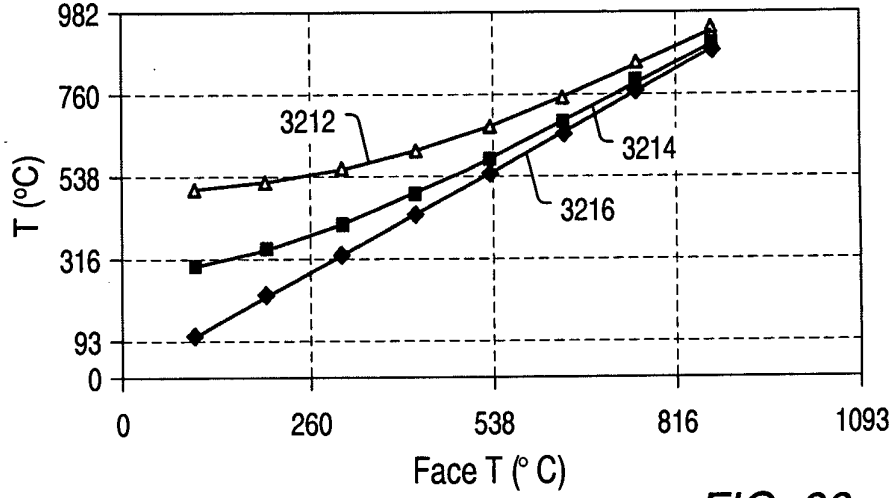


FIG. 86

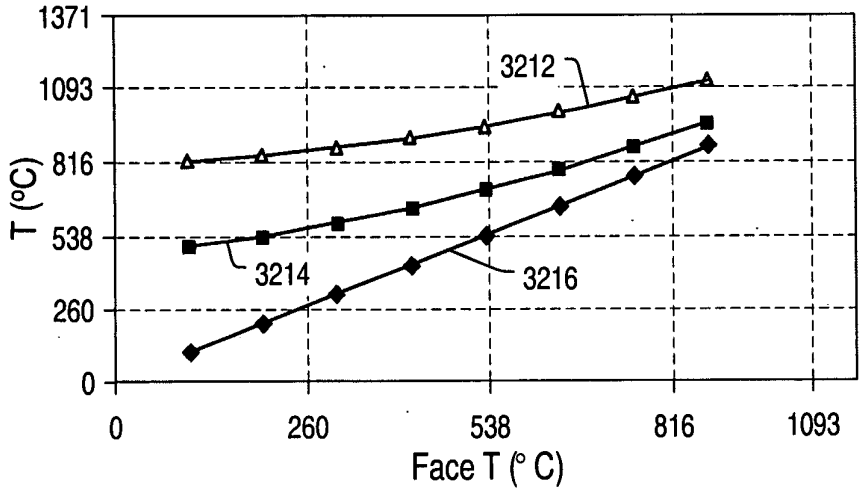


FIG. 87

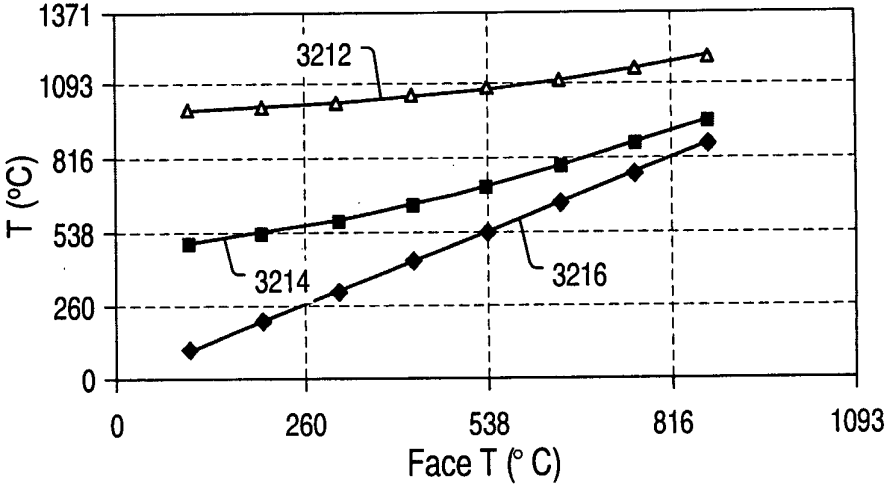
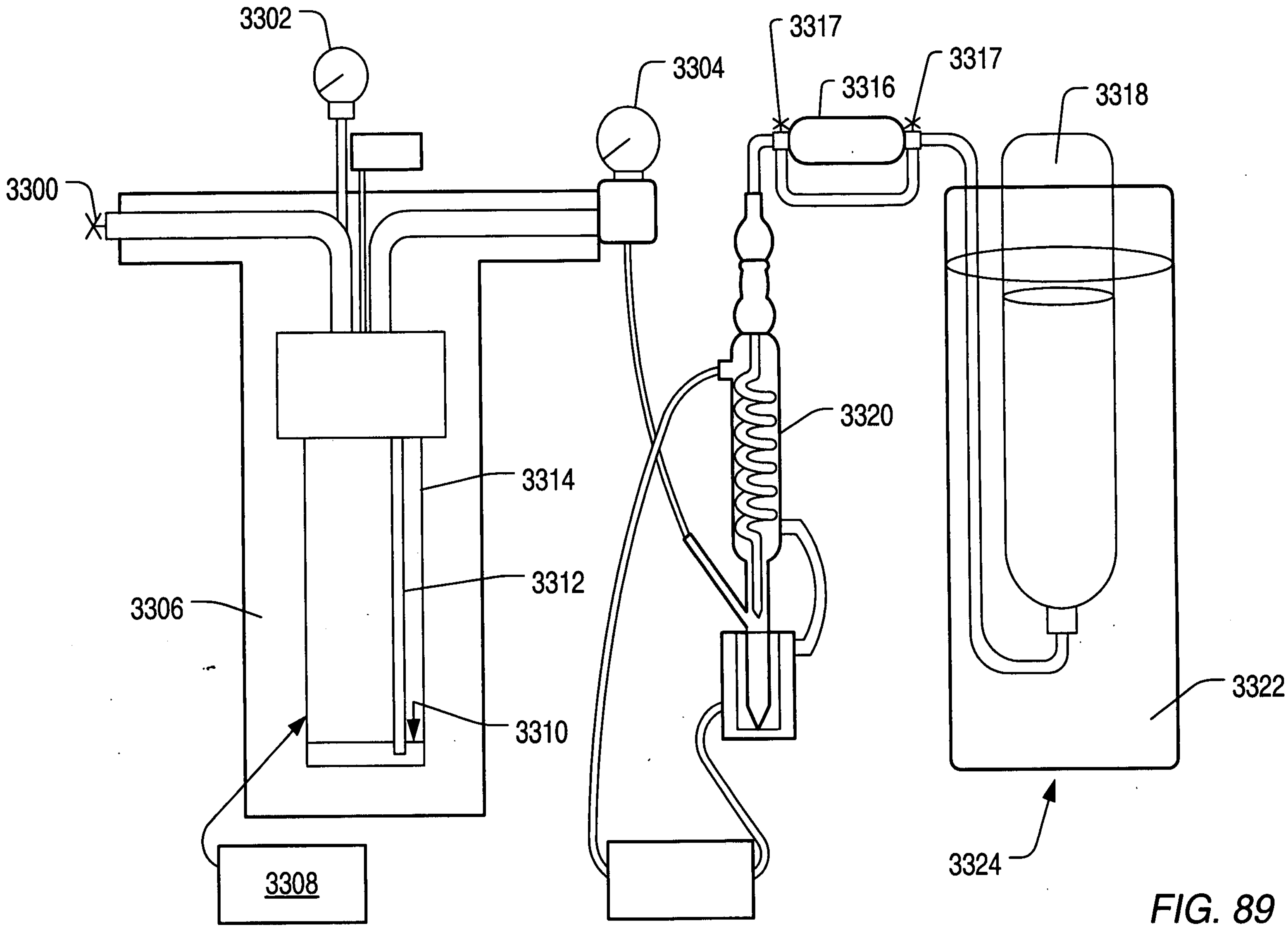


FIG. 88


3300
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3304
3306
3308
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3312
3314
3316
3317
3317
3318
3320
3322
3324

FIG. 89

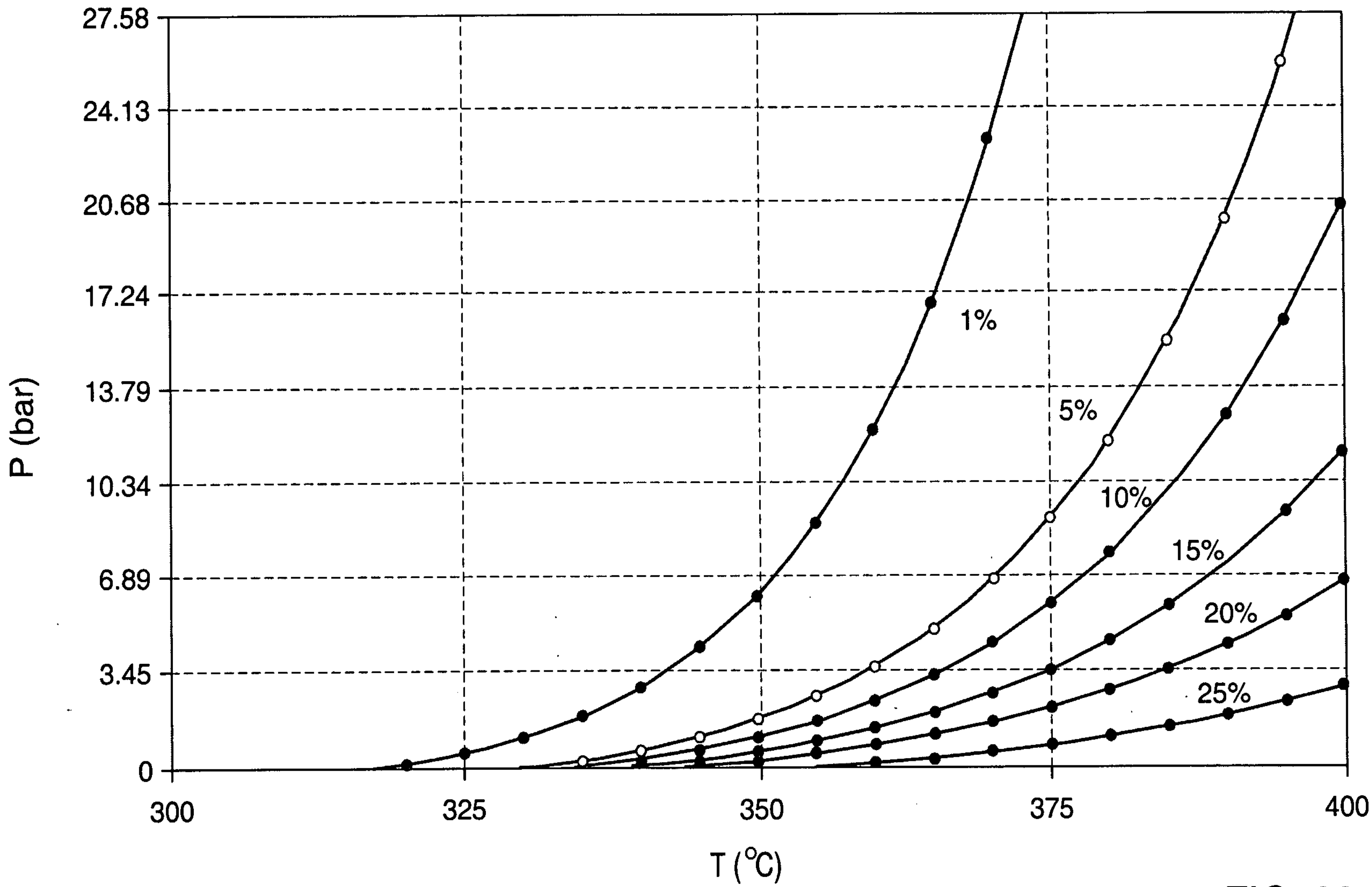

27.58
24.13
20.68
17.24
13.79
10.34
6.89
3.45
0
P (bar)
300
325
350
375
400
T (°C)
1%
5%
10%
15%
20%
25%

FIG. 90

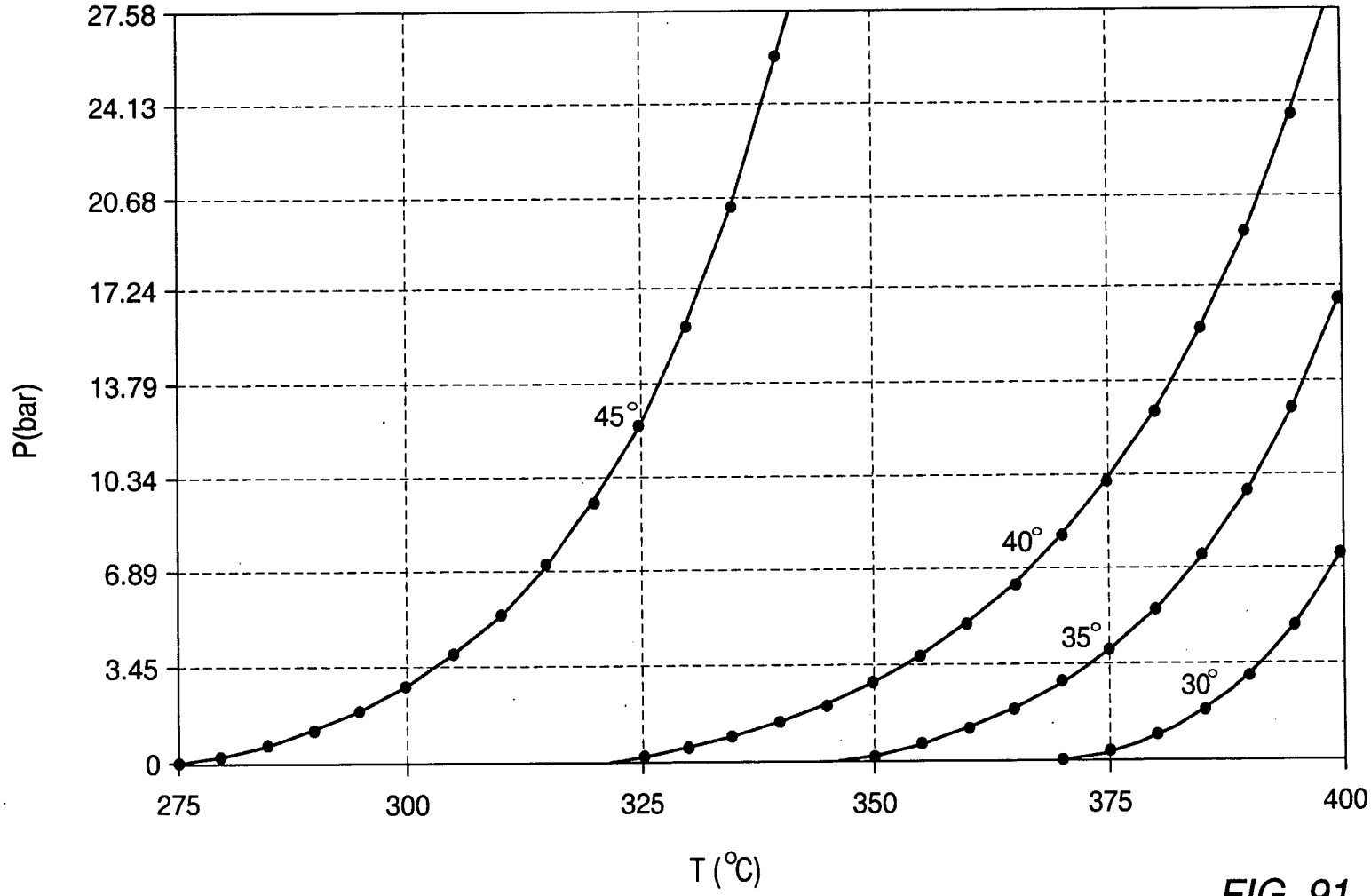

27.58
24.13
20.68
17.24
13.79
10.34
6.89
3.45
0
P(bar)
45°
40°
35°
30°
275
300
325
350
375
400
T (°C)

FIG. 91

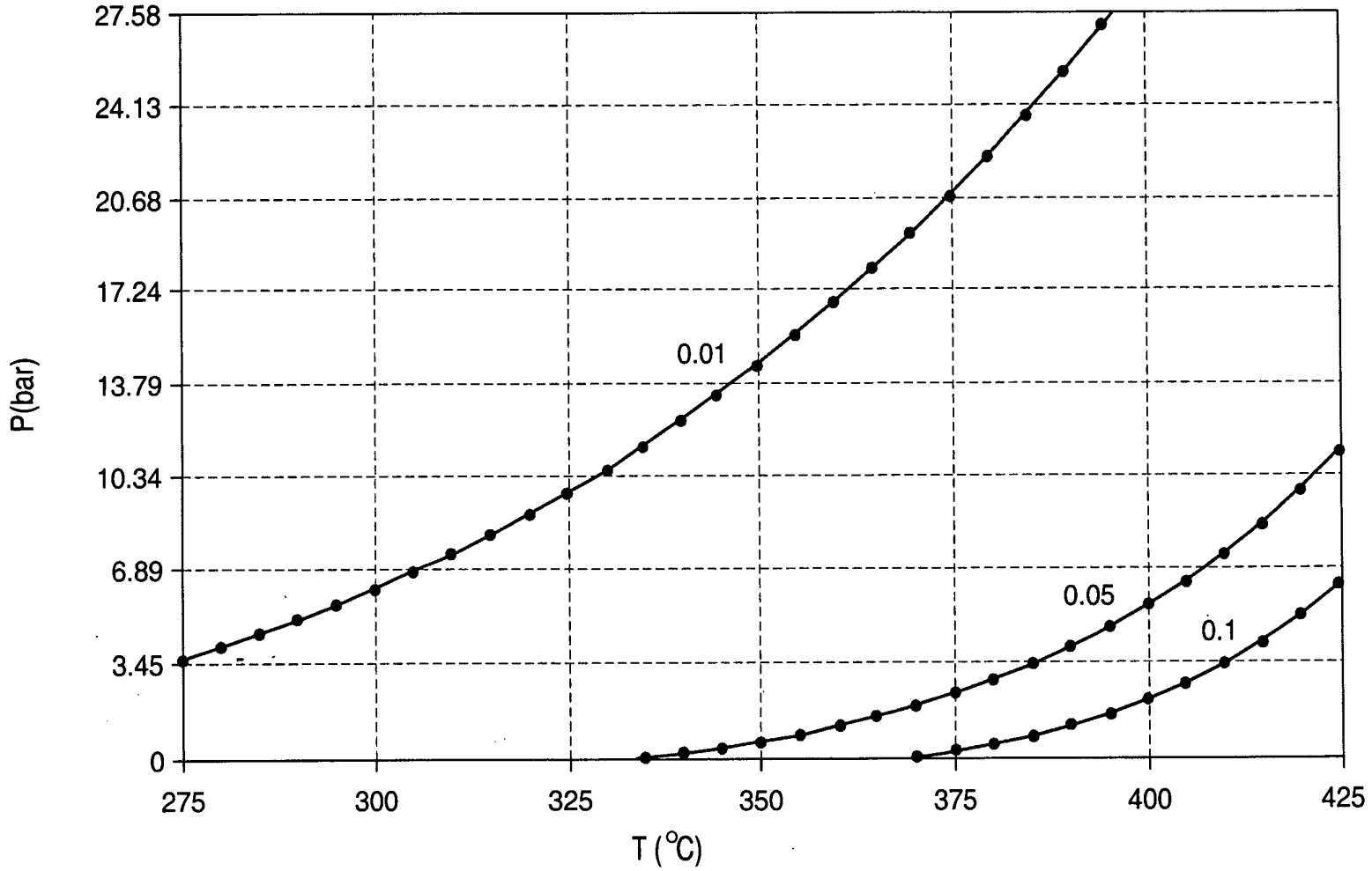


FIG. 92

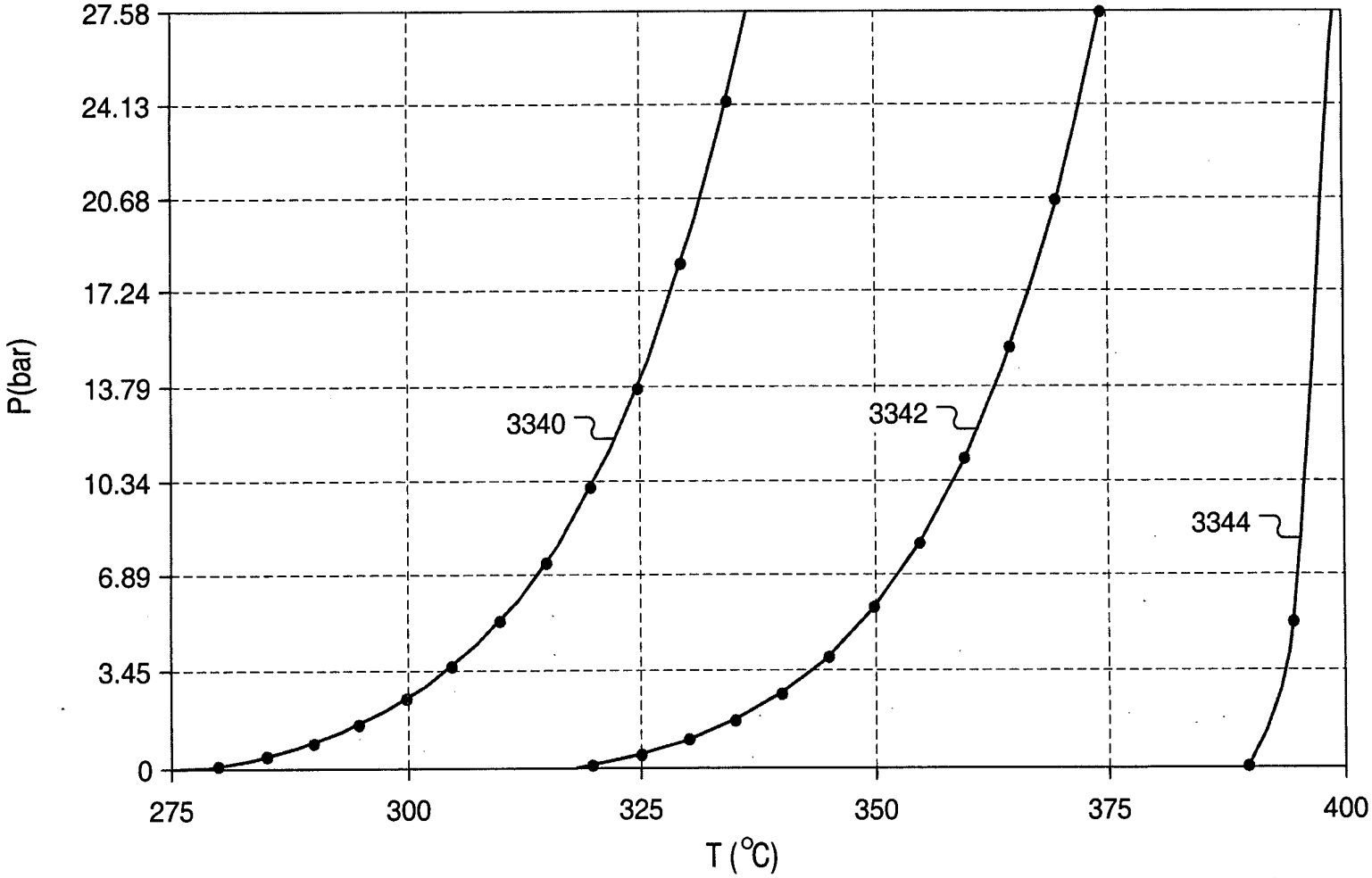


FIG. 93

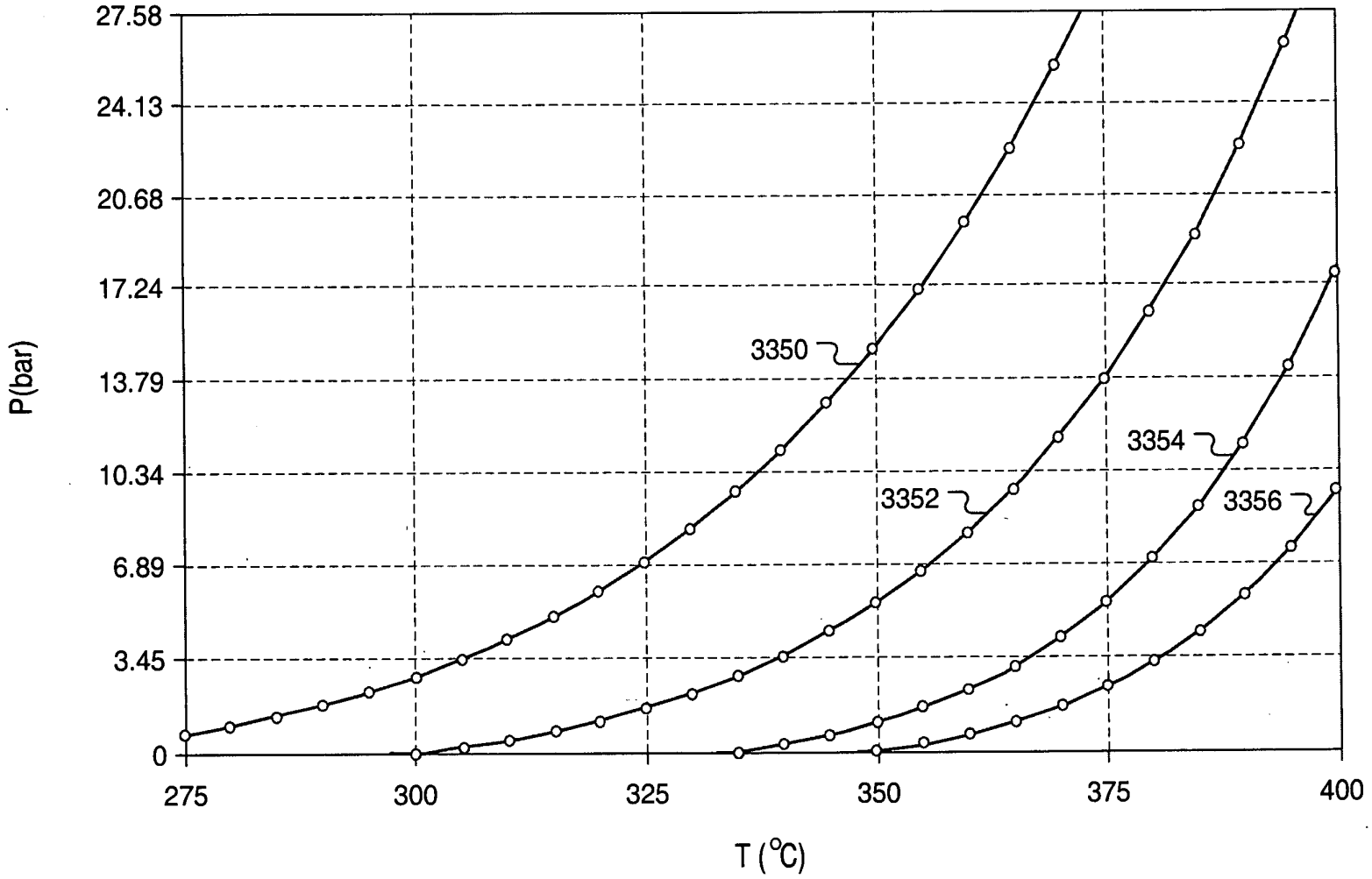


FIG. 94

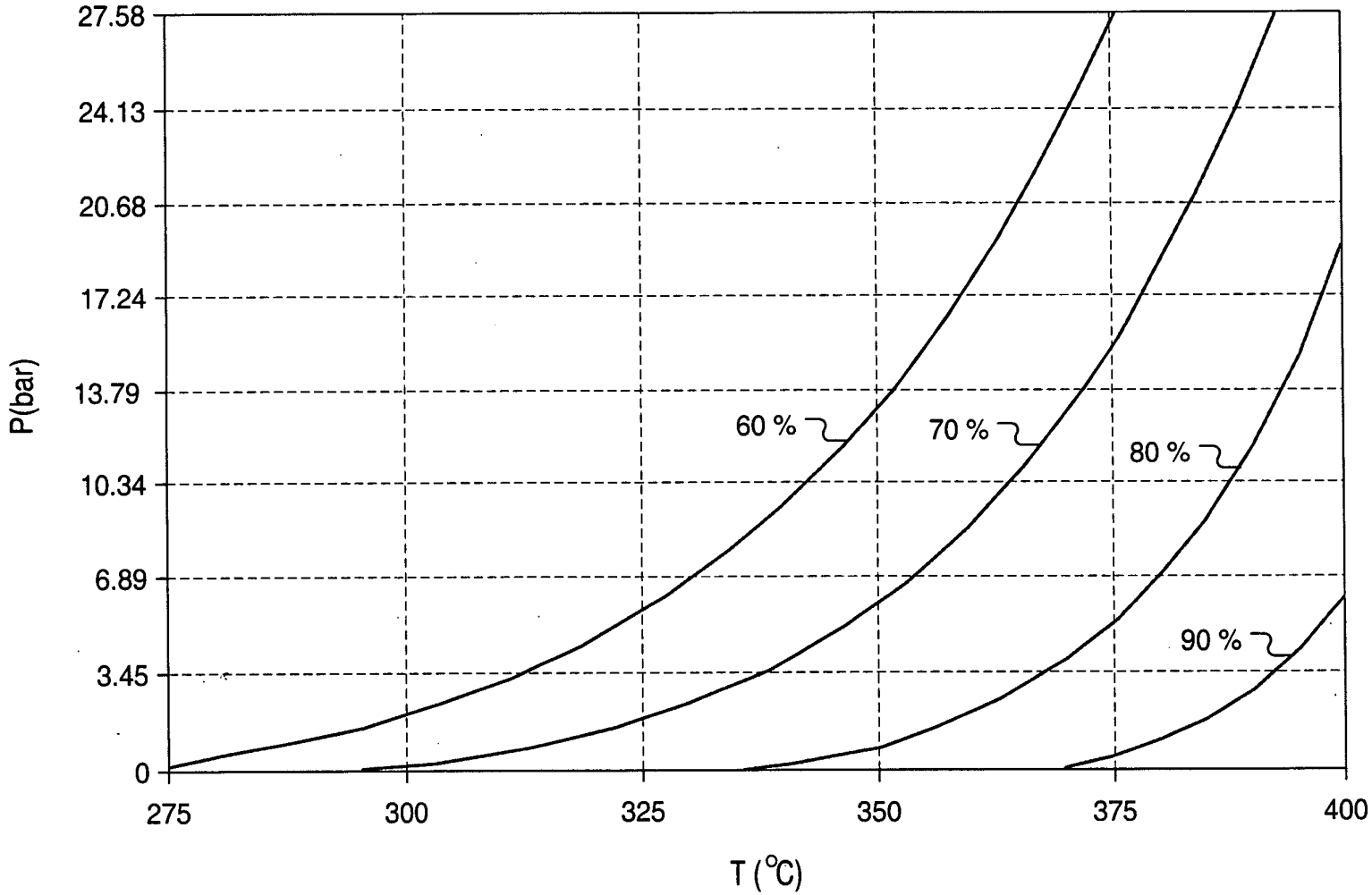


FIG. 95

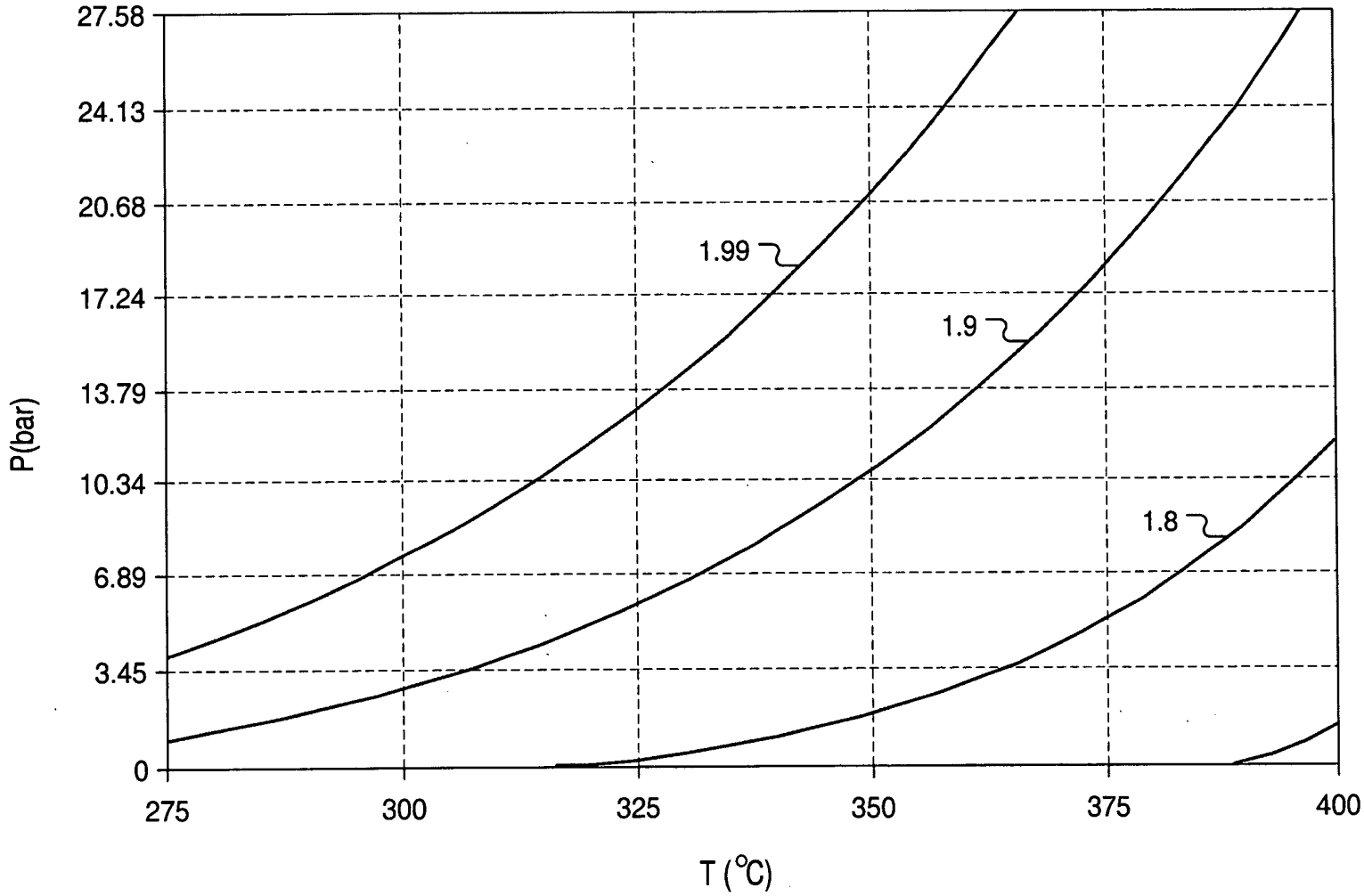

27.58
24.13
20.68
17.24
13.79
10.34
6.89
3.45
0
P(bar)
1.99
1.9
1.8
275
300
325
350
375
400
T (°C)

FIG. 96

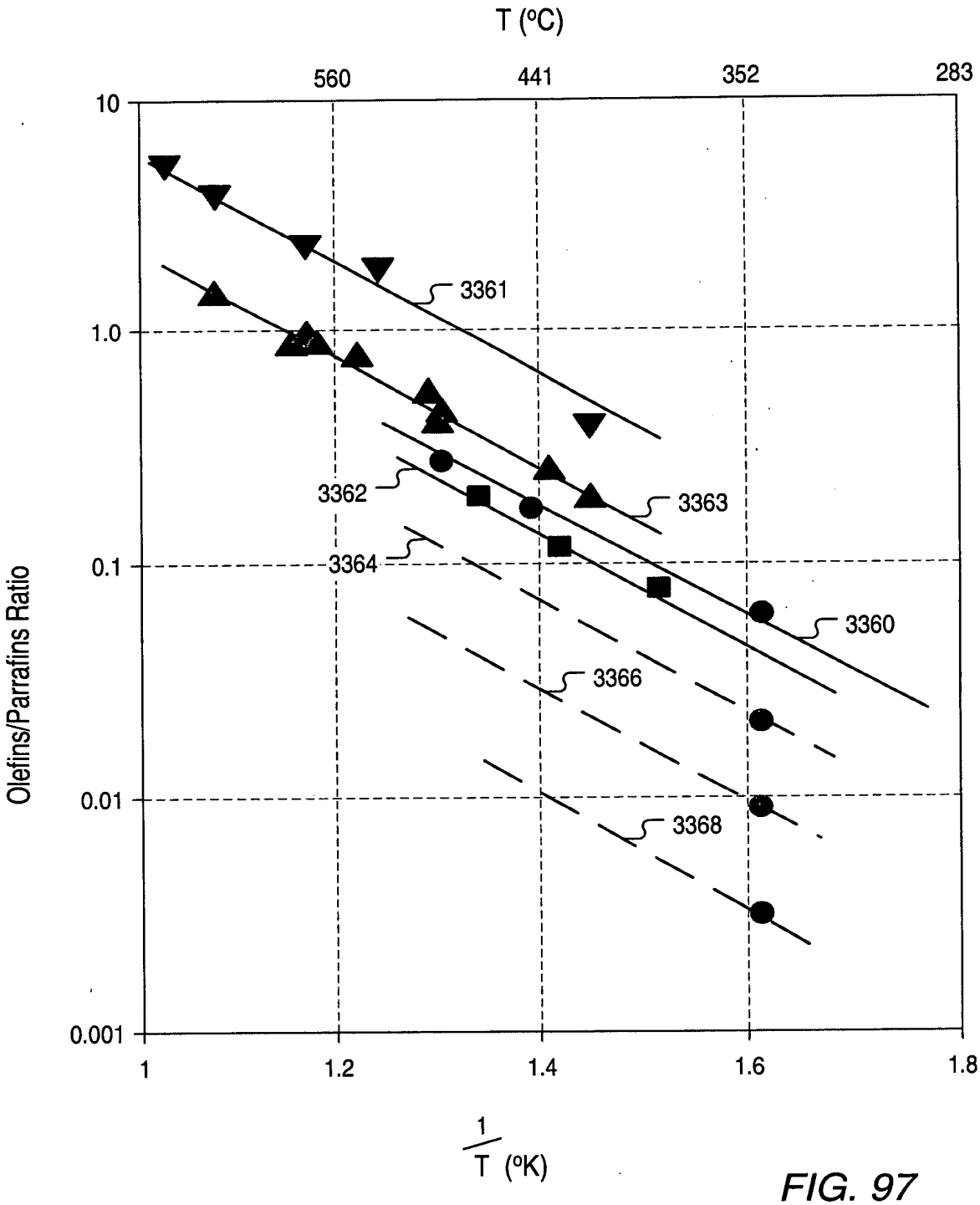

T (°C)
560
441
352
283
10
1.0
0.1
0.01
0.001
Olefins/Parrafins Ratio
3361
3362
3363
3364
3360
3366
3368
1
1.2
1.4
1.6
1.8
1/T (°K)

FIG. 97

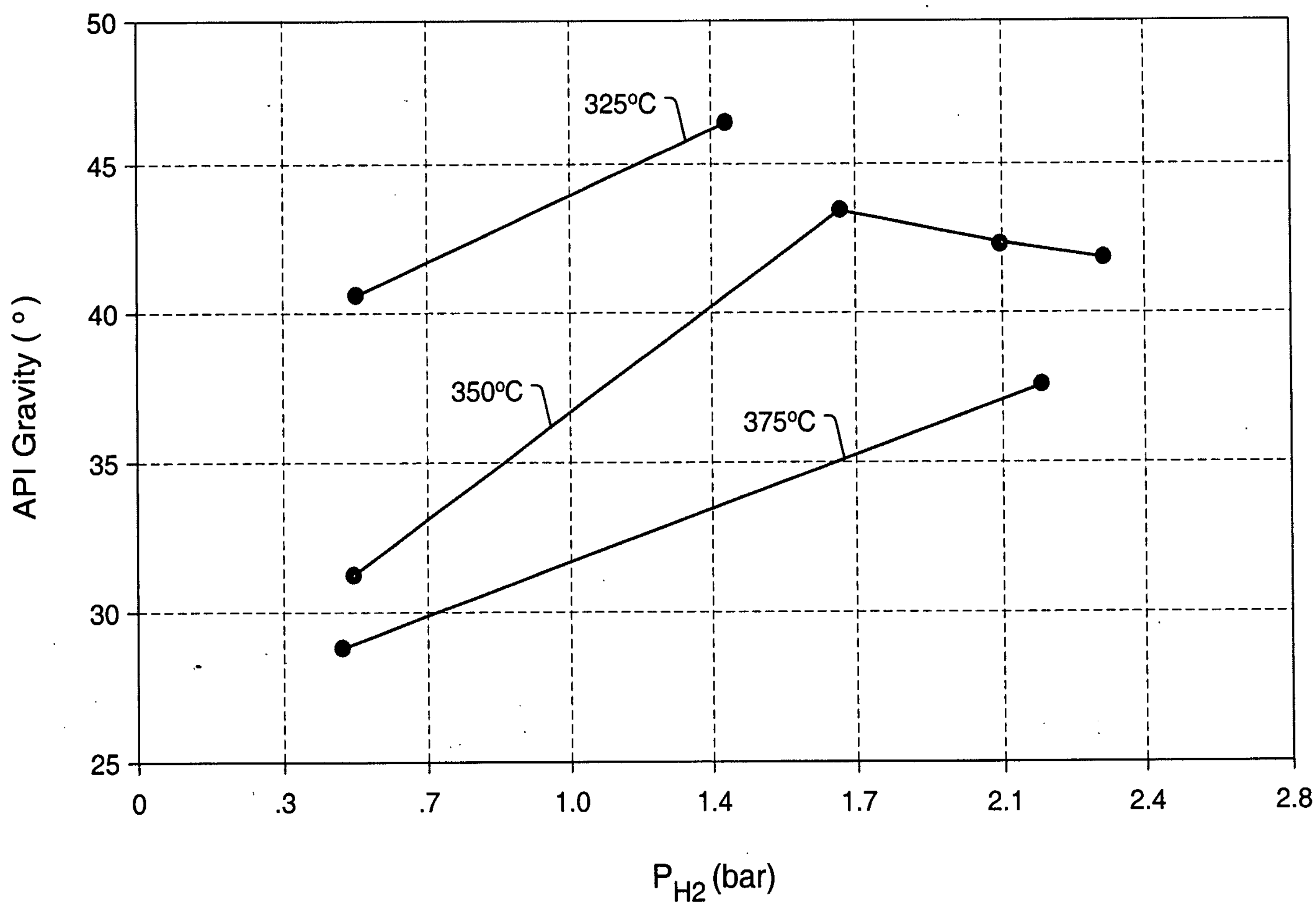


FIG. 98

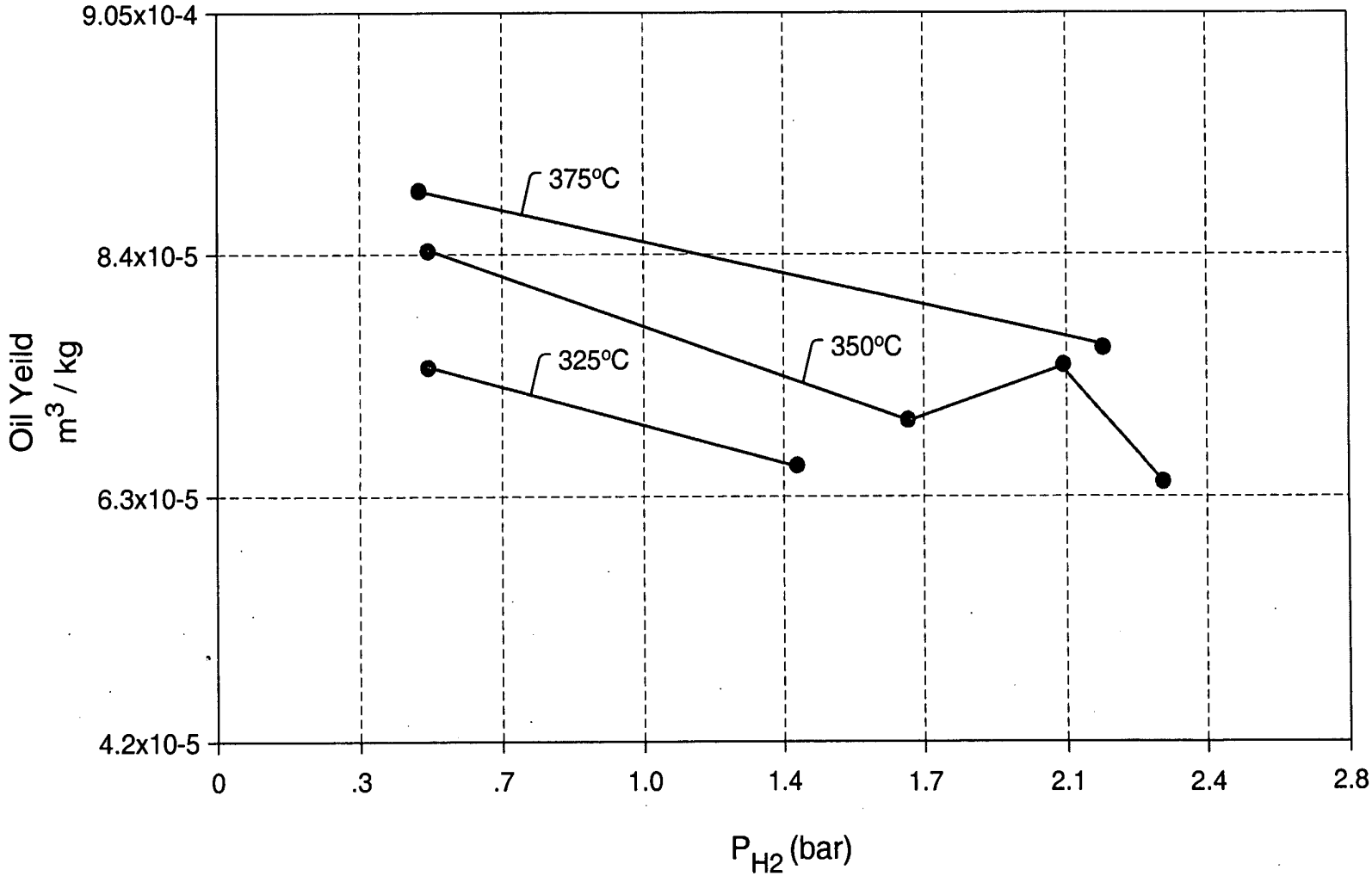


FIG. 99

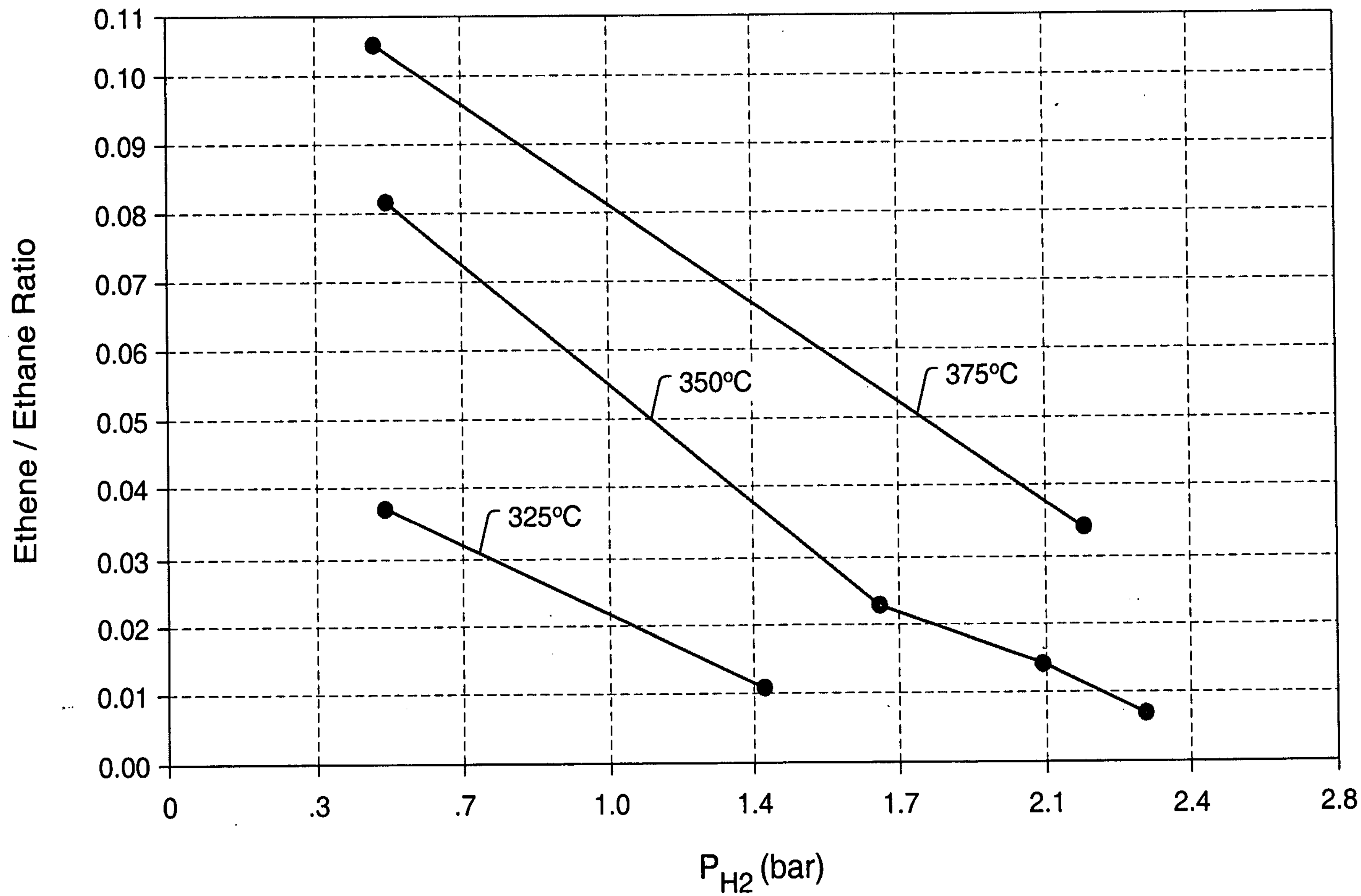

0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Ethene / Ethane Ratio
0
.3
.7
1.0
1.4
1.7
2.1
2.4
2.8
P_{H2} (bar)
325°C
350°C
375°C

FIG. 100

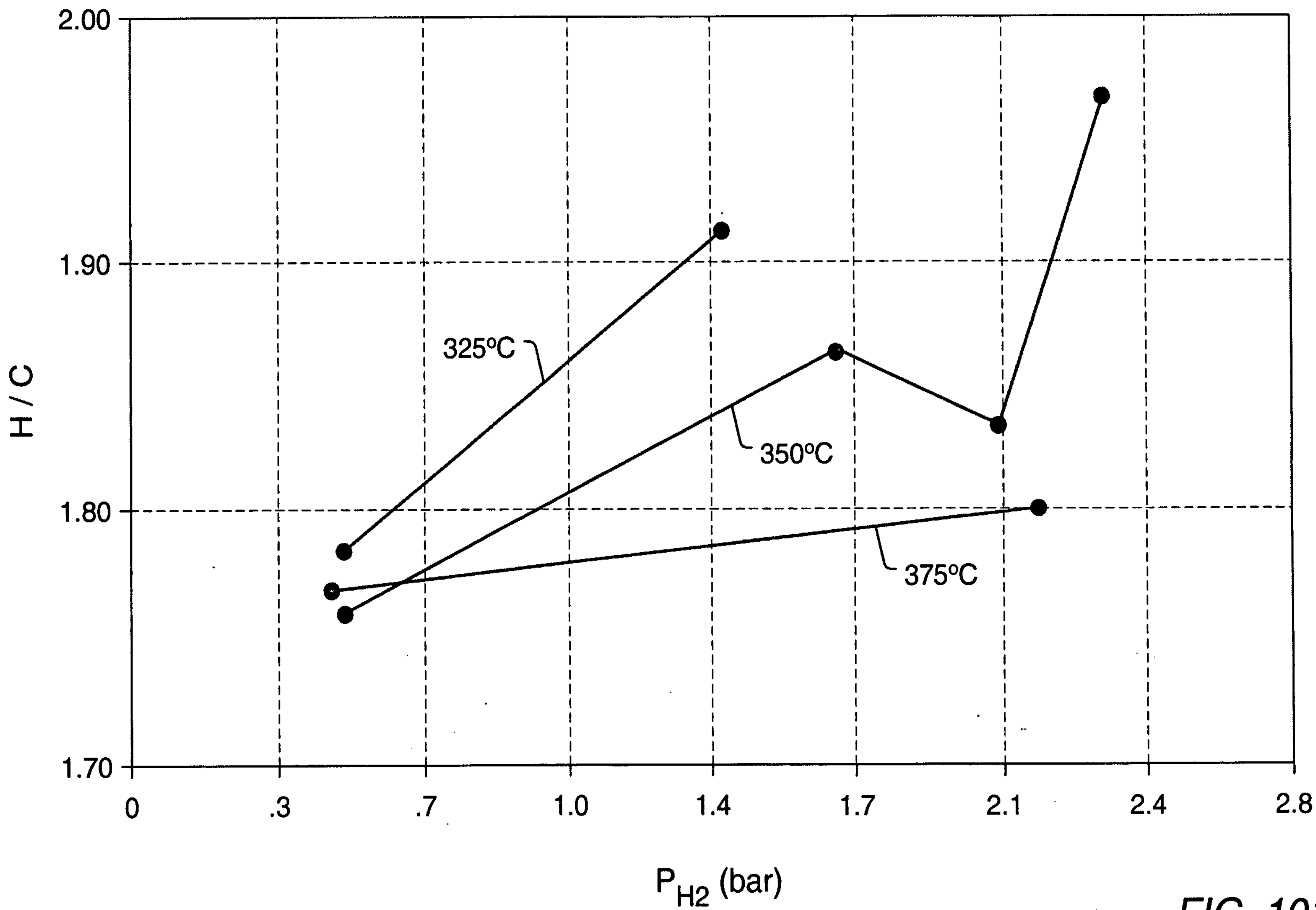


FIG. 101

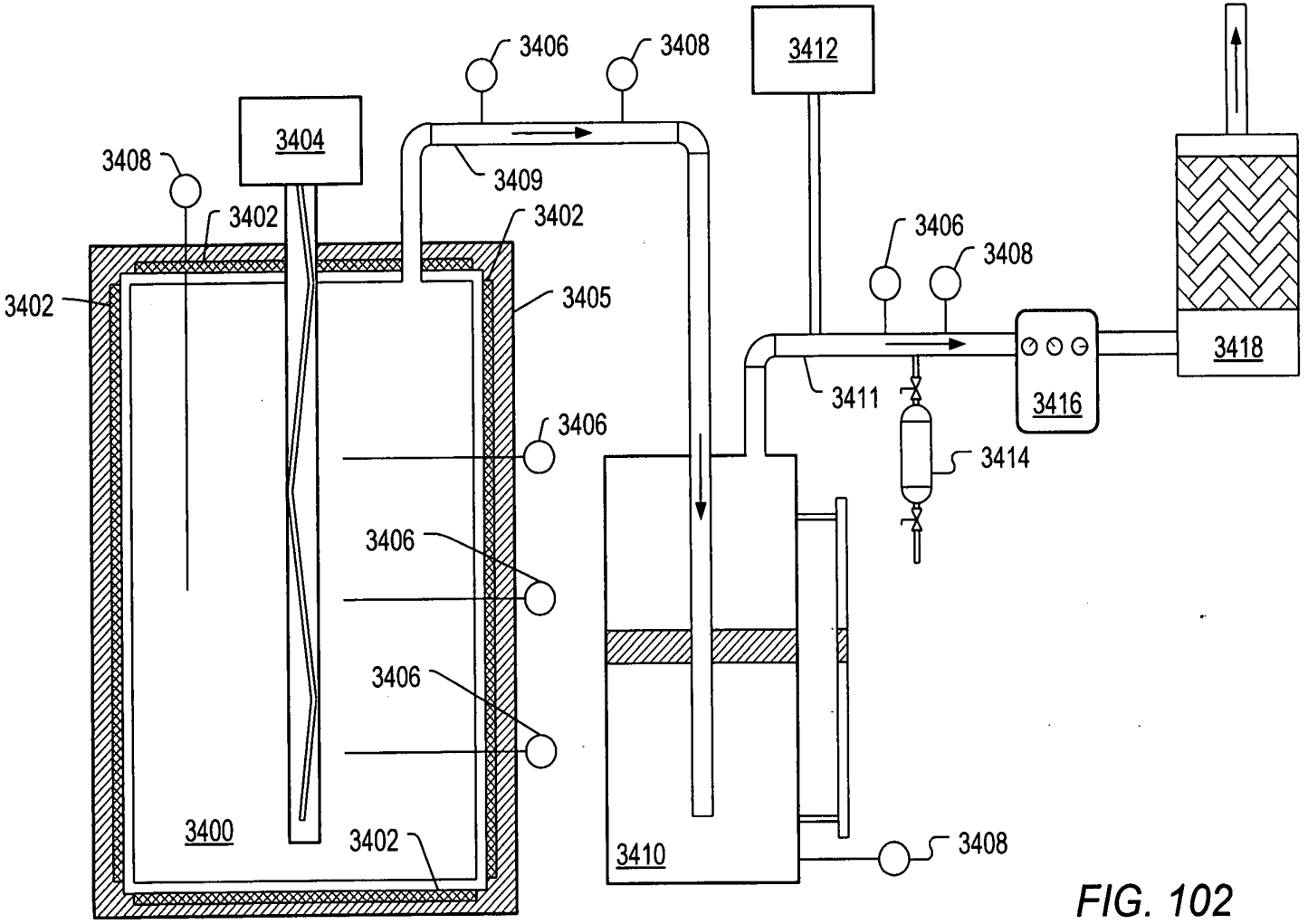

3406
3408
3412
3404
3408
3409
3402
3402
3406
3408
3402
3405
3418
3411
3416
3406
3414
3406
3406
3400
3402
3410
3408

FIG. 102

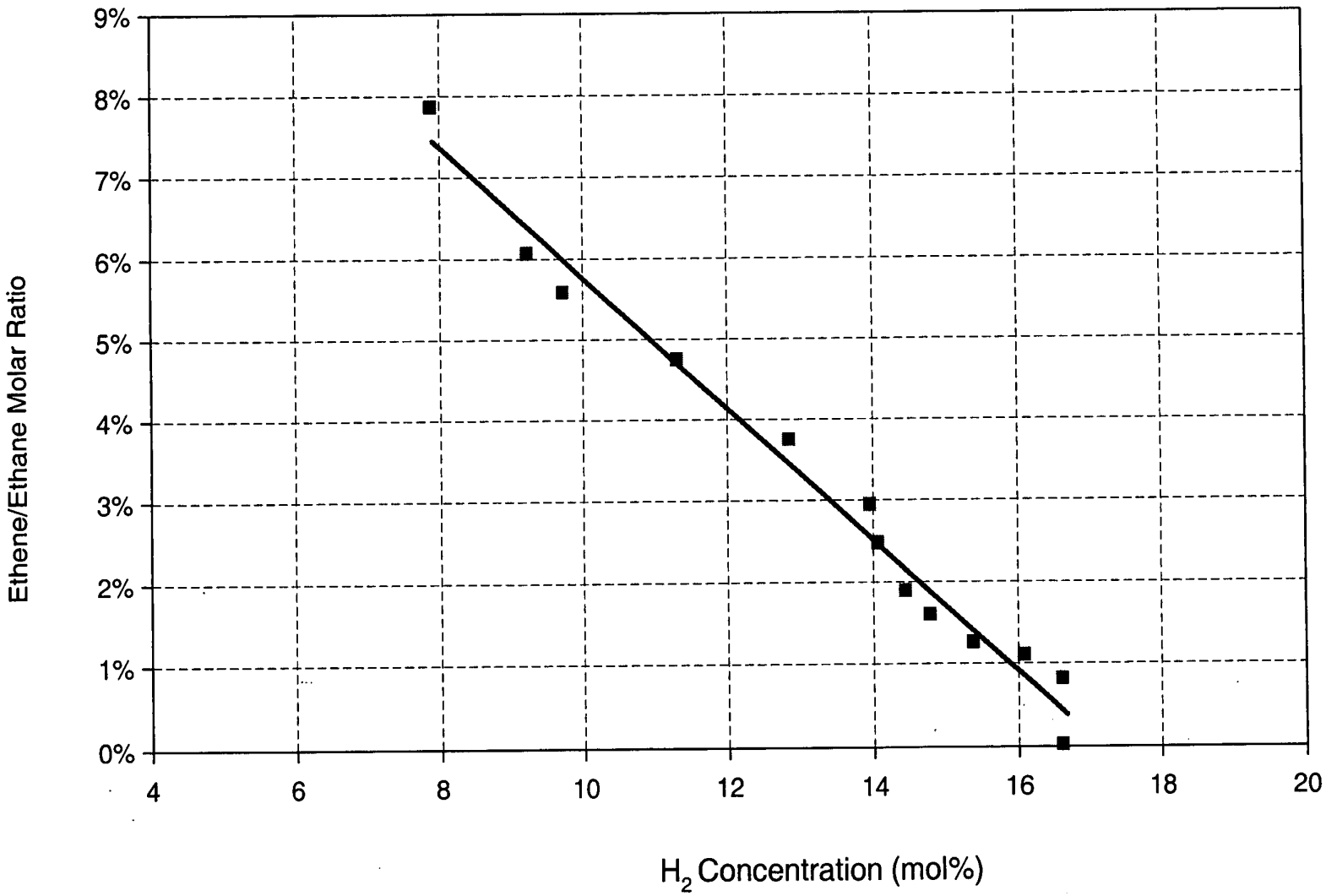
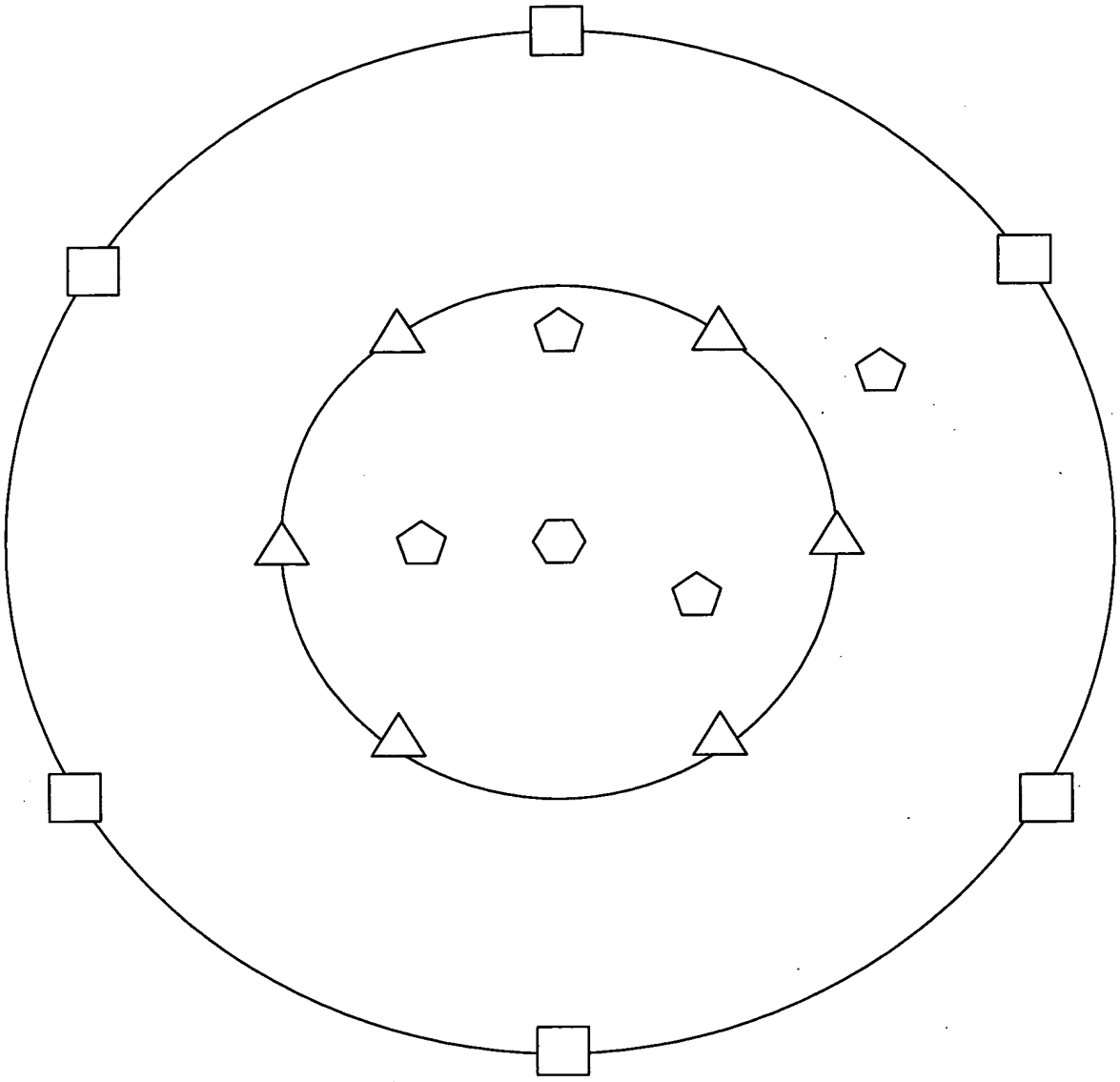

9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
Ethene/Ethane Molar Ratio
4
6
8
10
12
14
16
18
20
H2 Concentration (mol%)

FIG. 103



△ - 3600

⬠ - 3603

□ - 3604

⬡ - 3602

FIG. 104

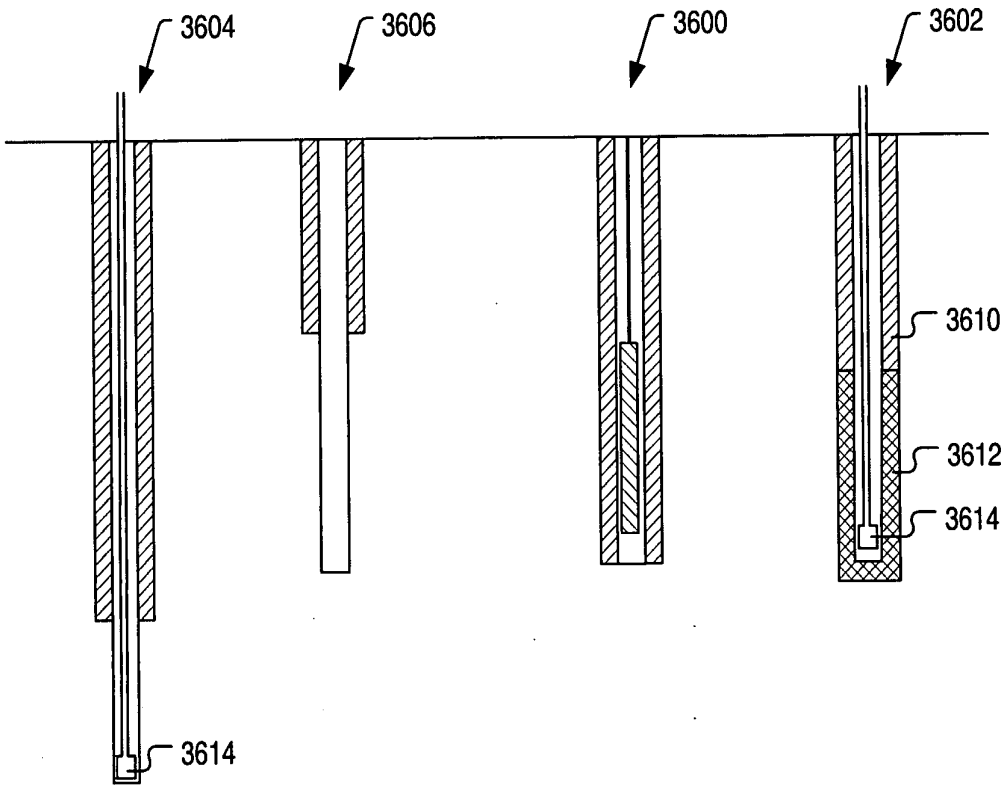


FIG. 105

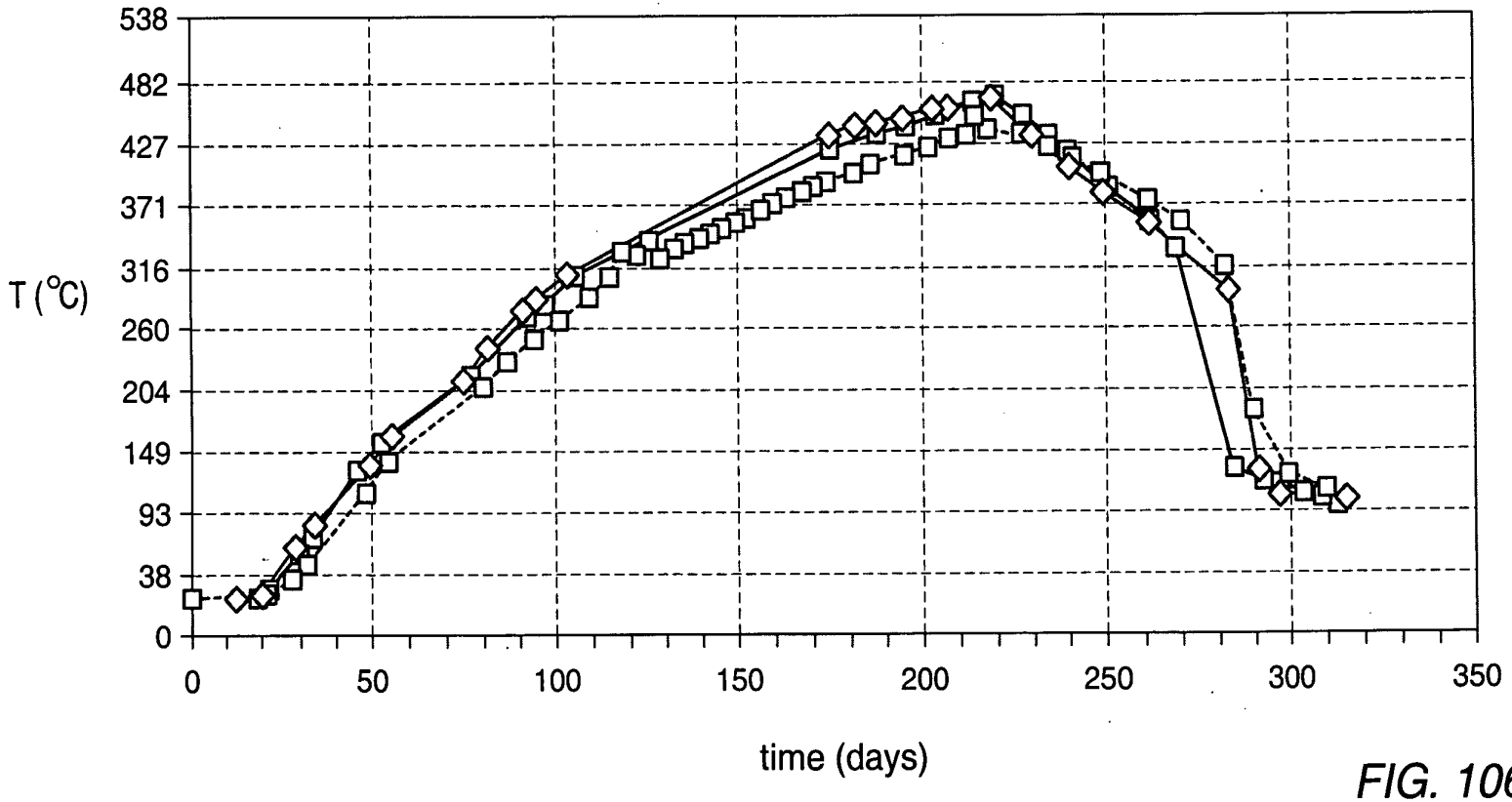

538
482
427
371
316
260
204
149
93
38
0
T (°C)
0
50
100
150
200
250
300
350
time (days)

FIG. 106

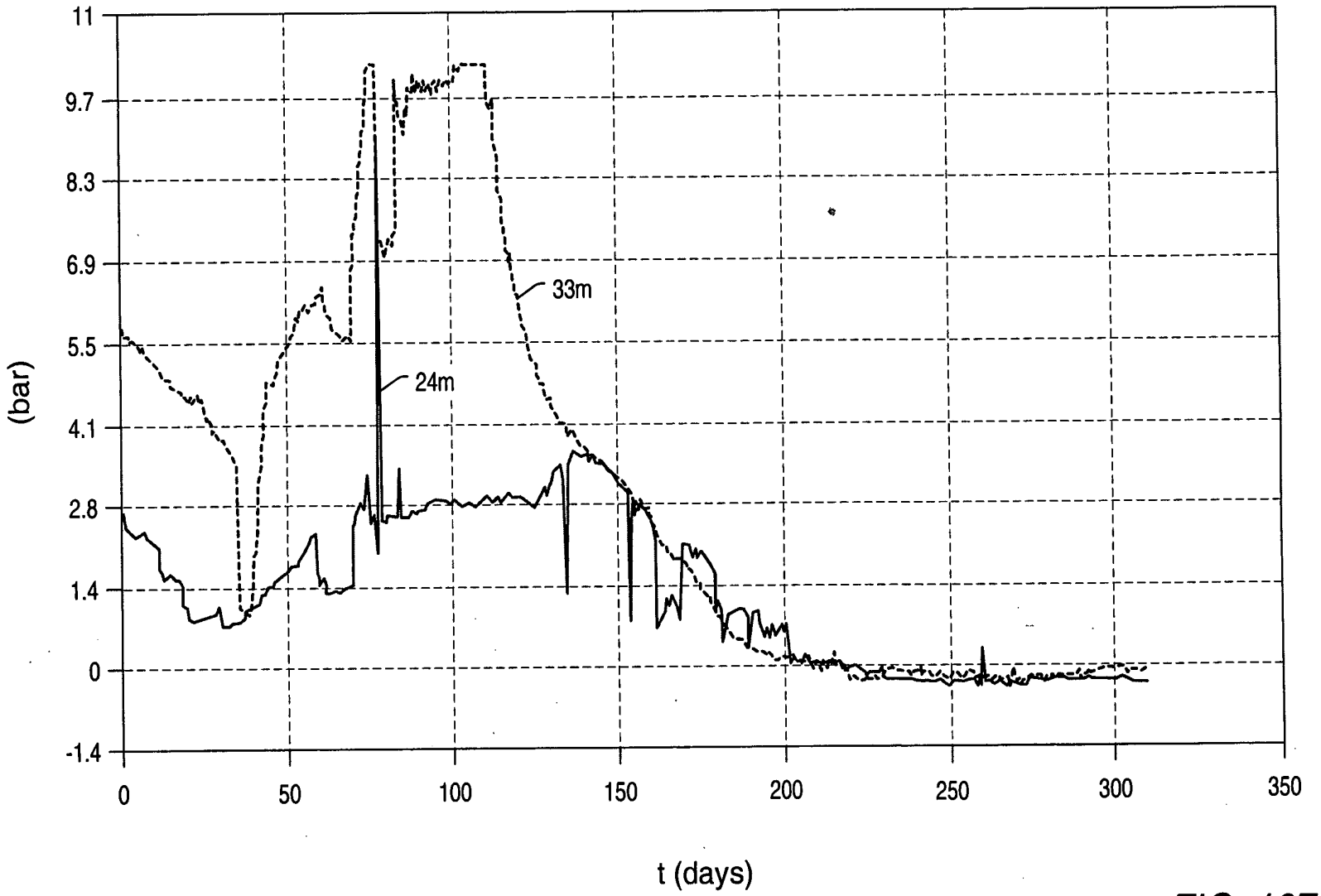


FIG. 107

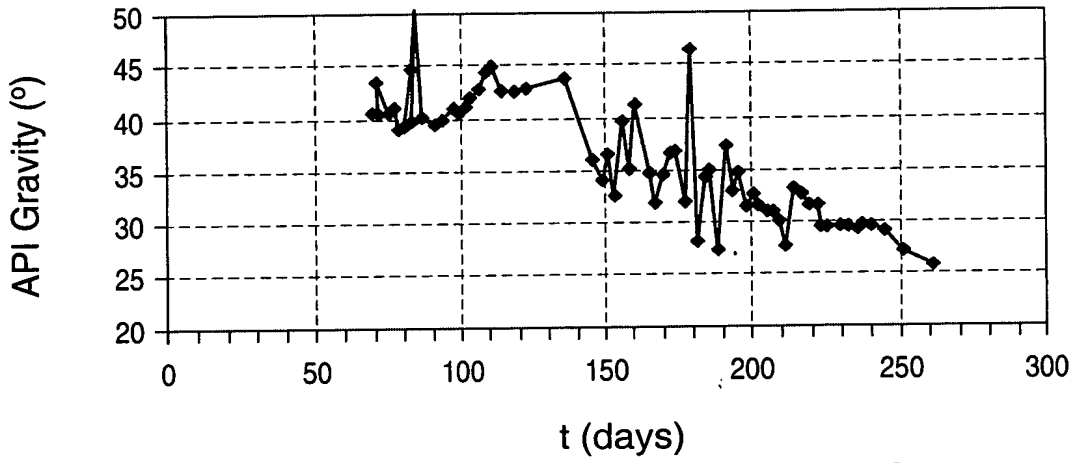


FIG. 108

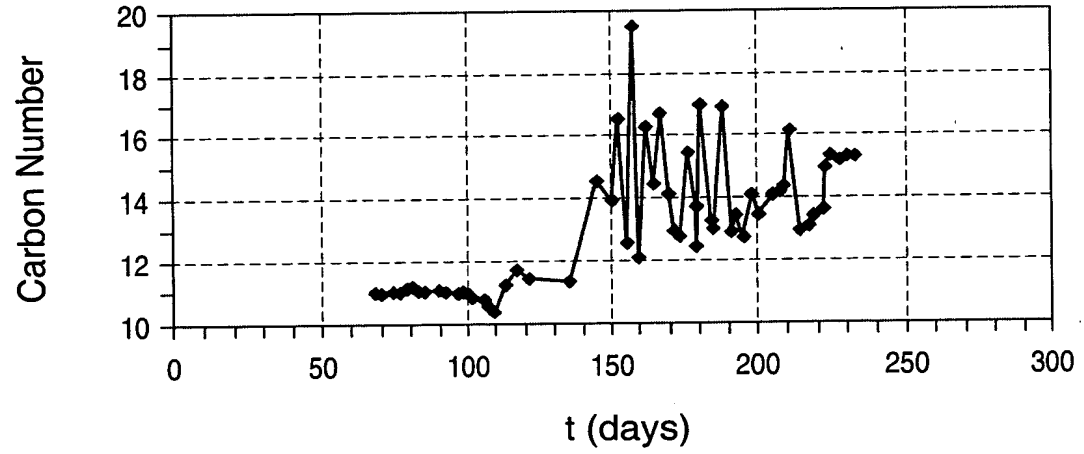


FIG. 109

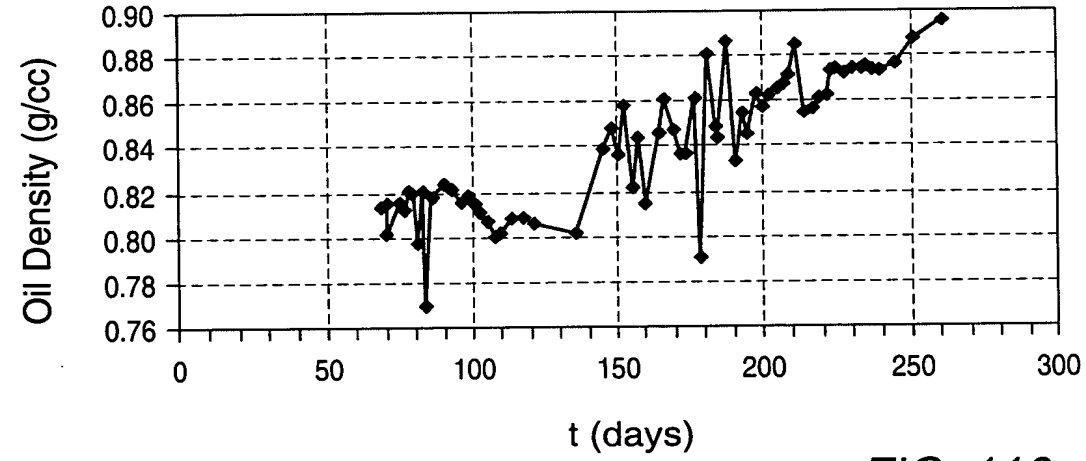
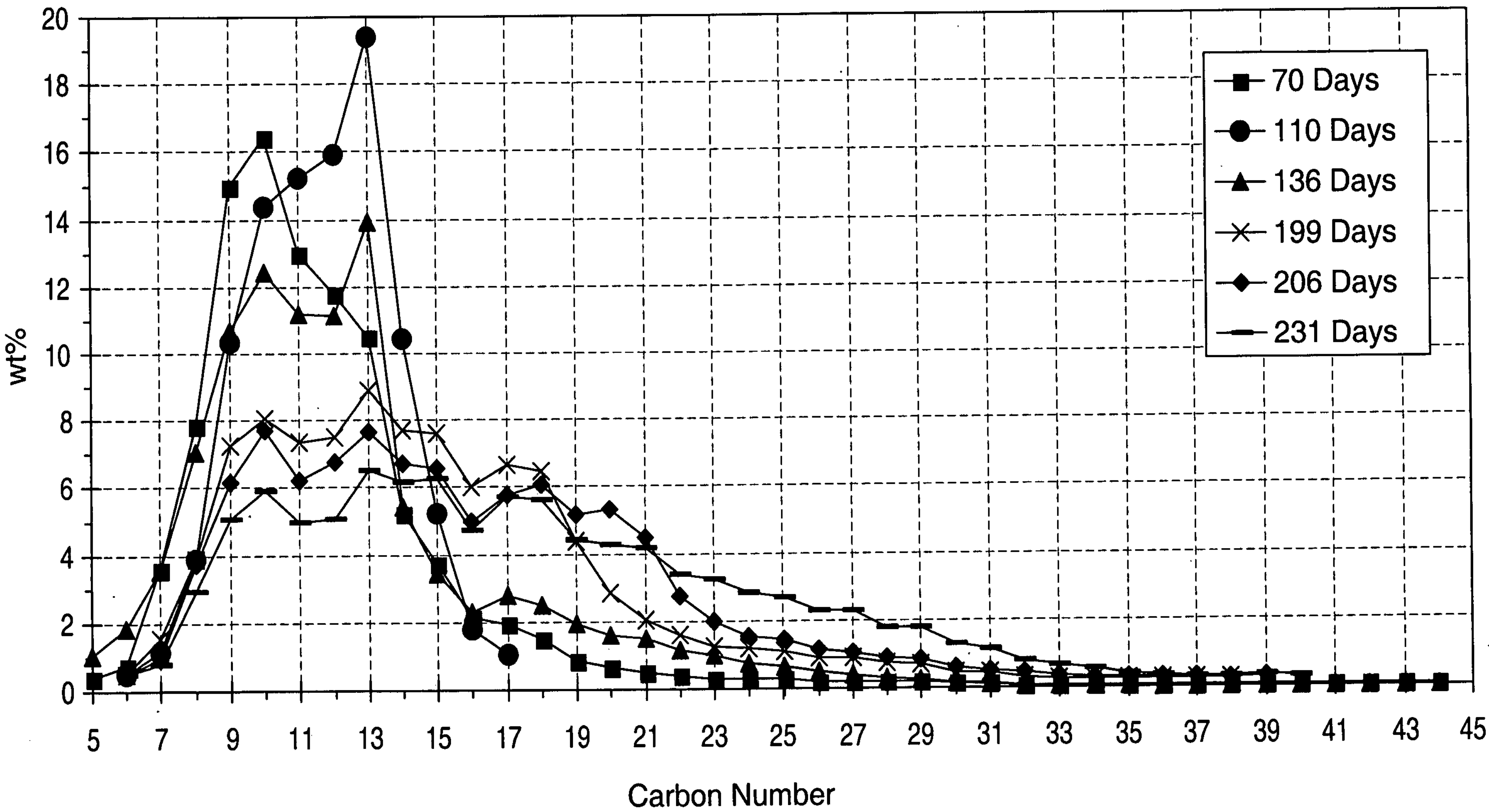


FIG. 110



70 Days
110 Days
136 Days
199 Days
206 Days
231 Days
wt%
Carbon Number

FIG. 111

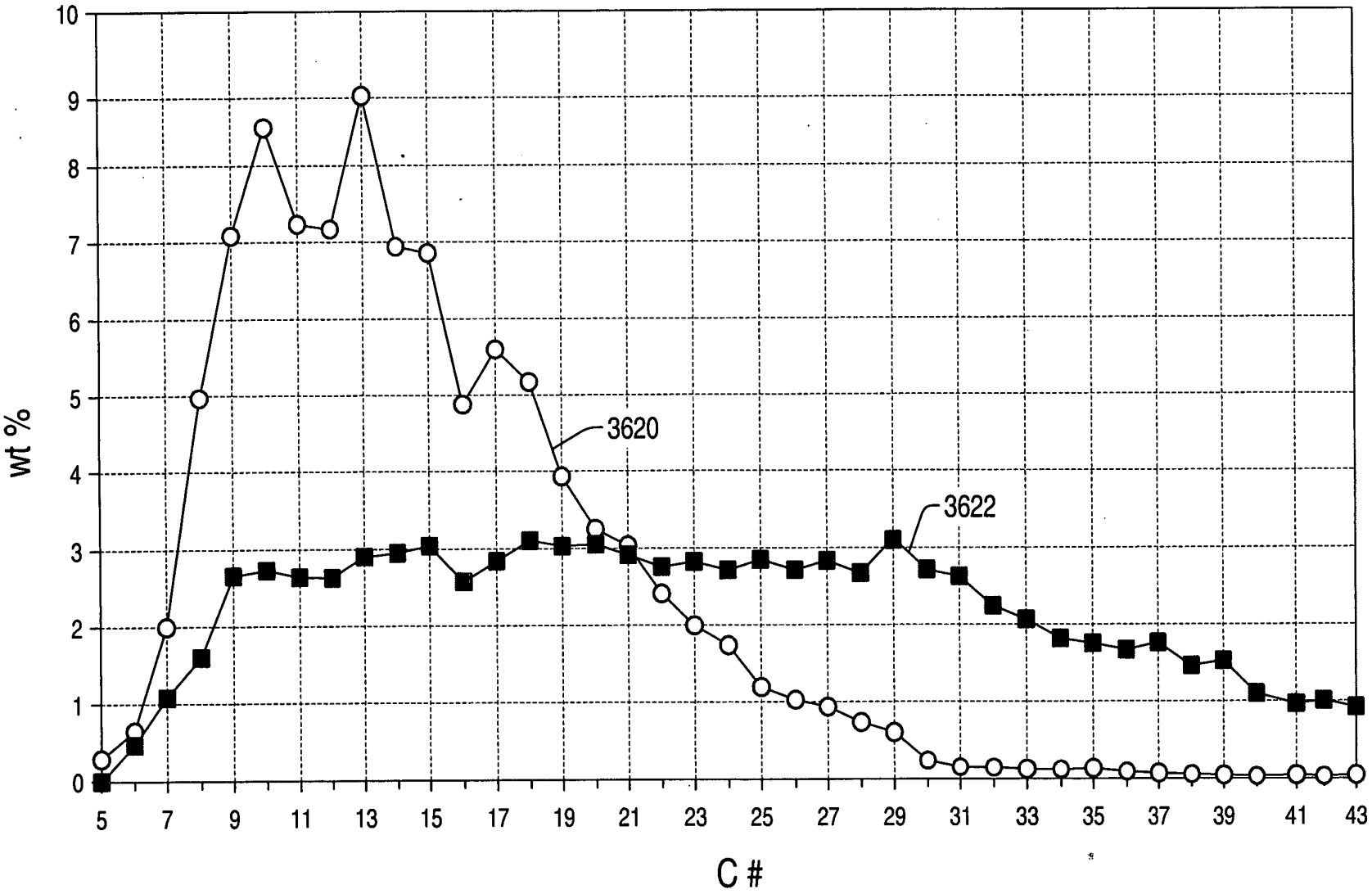

10
9
8
7
6
5
4
3
2
1
0
wt %
3620
3622
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
C #

FIG. 112

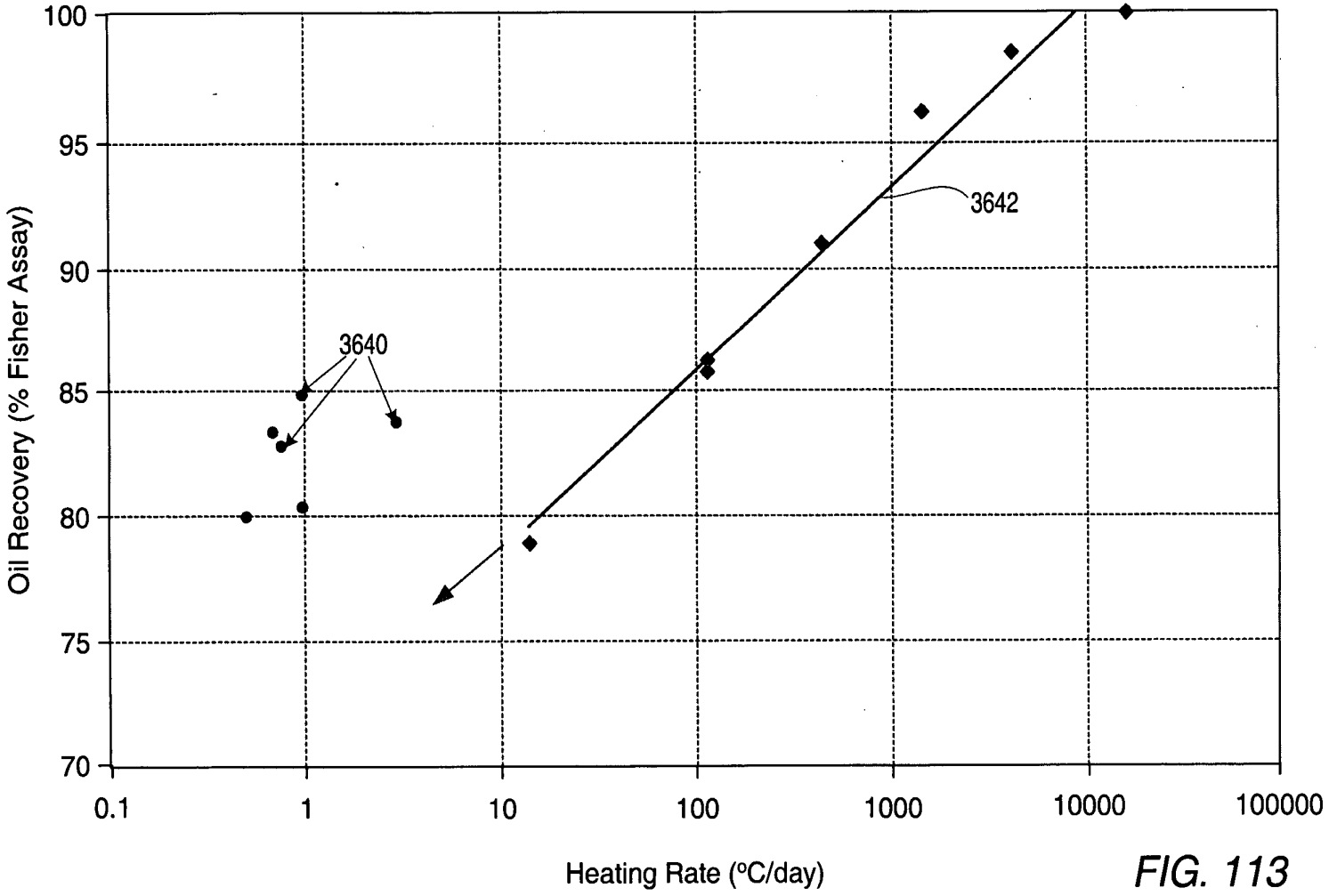

100
95
90
85
80
75
70
Oil Recovery (% Fisher Assay)
0.1
1
10
100
1000
10000
100000
Heating Rate (°C/day)
3640
3642

FIG. 113

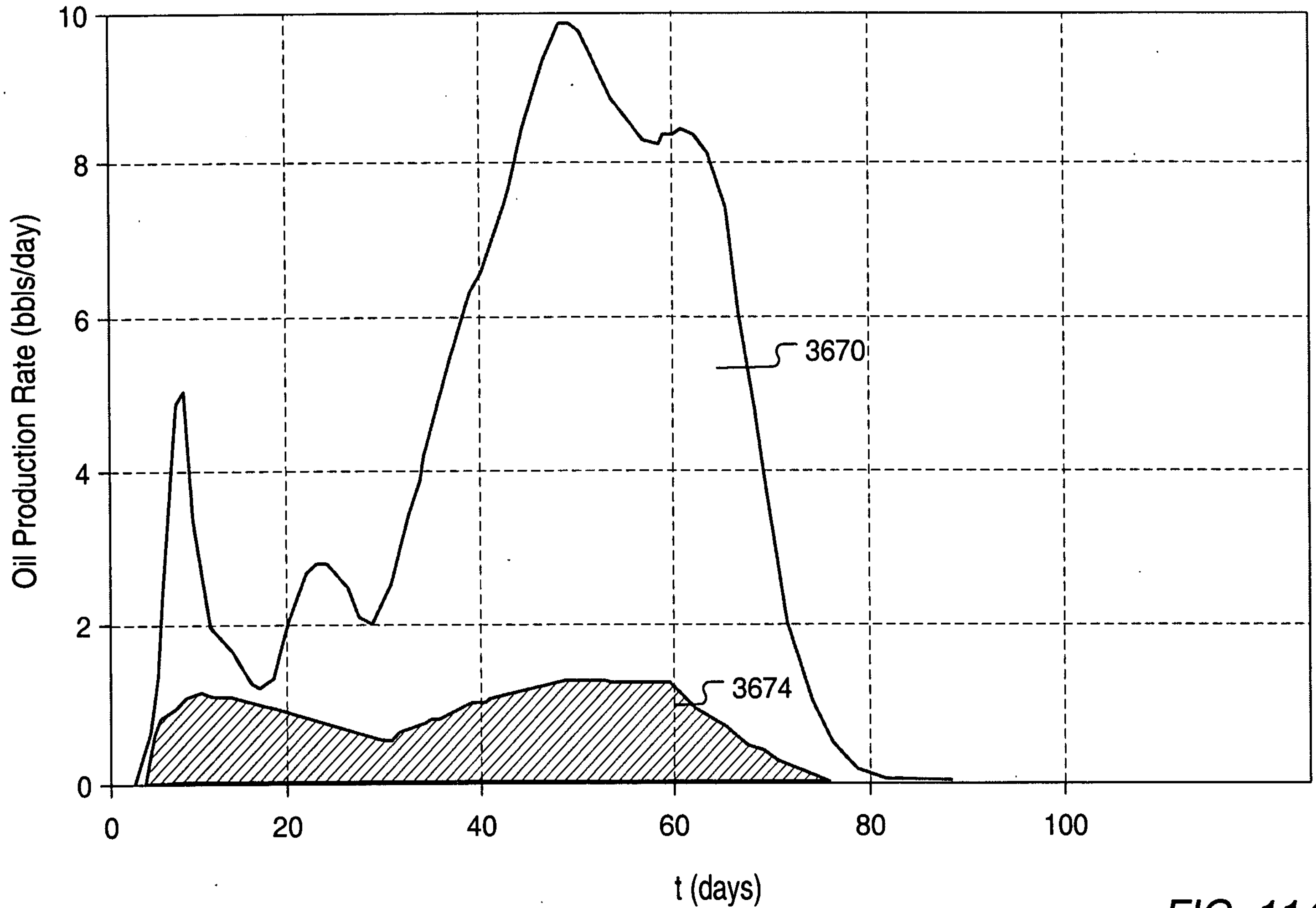

Oil Production Rate (bbls/day)
10
8
6
4
2
0
0
20
40
60
80
100
t (days)
3670
3674

FIG. 114

"10 14 2 40" 9 9 2 1 4 8 6 0

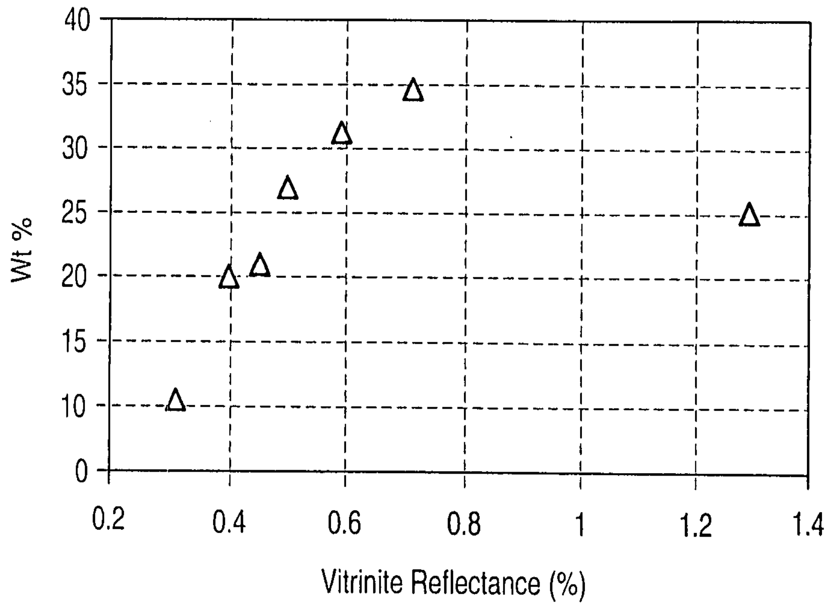


FIG. 115

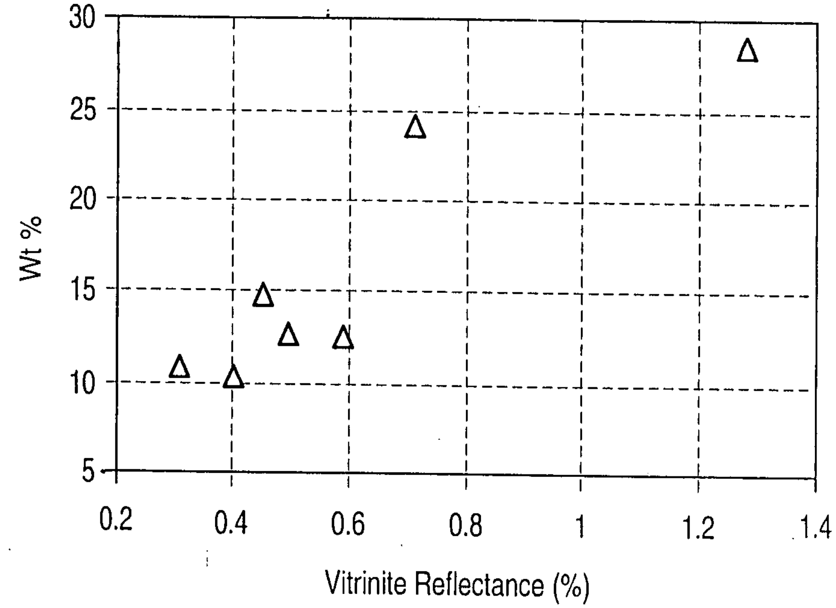


FIG. 116

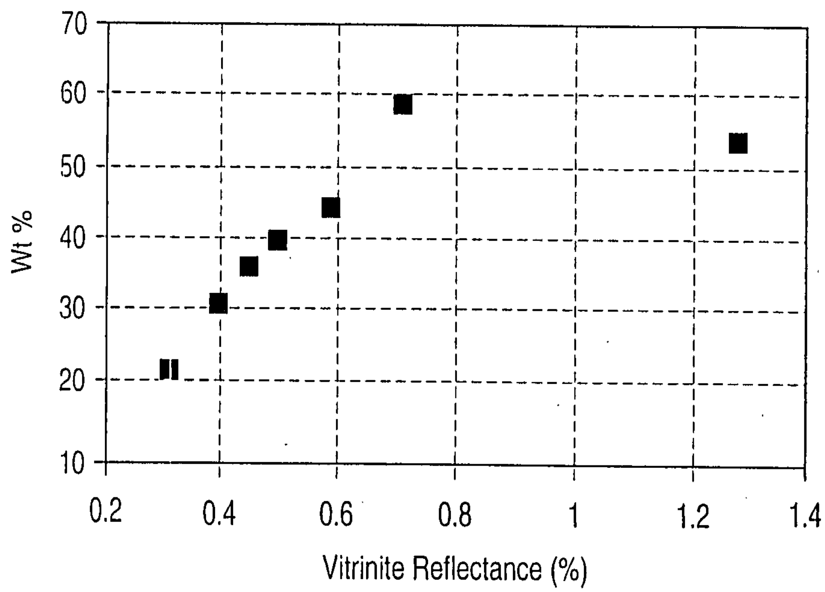


FIG. 117

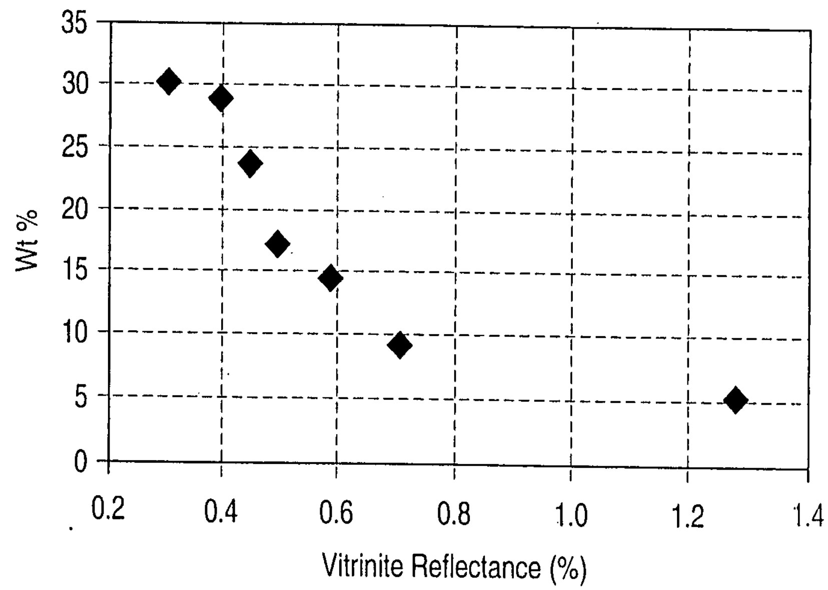


FIG. 118

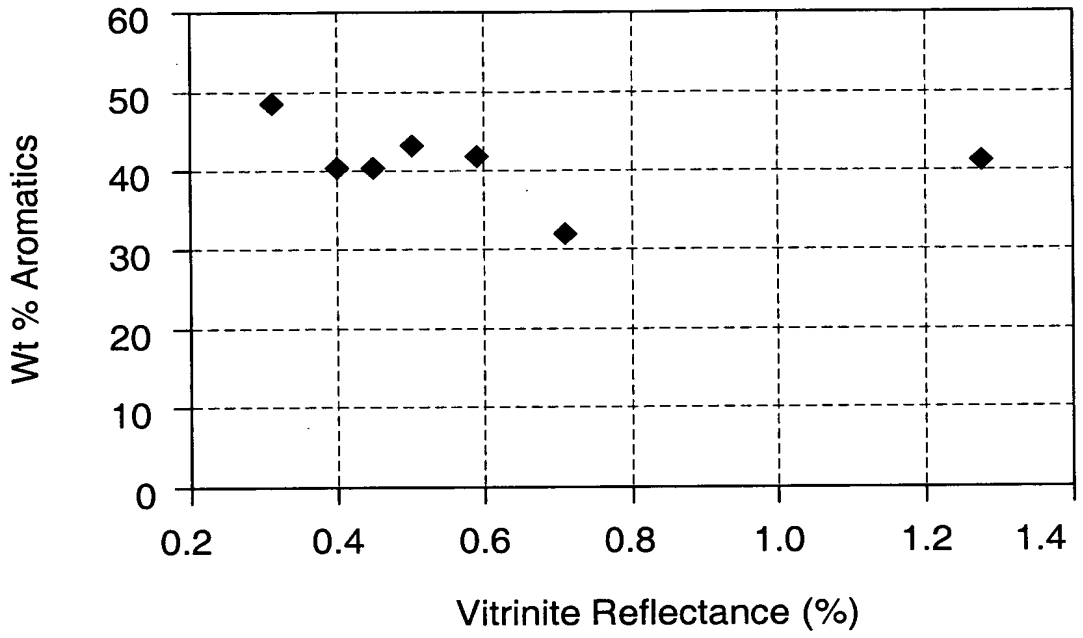


FIG. 119

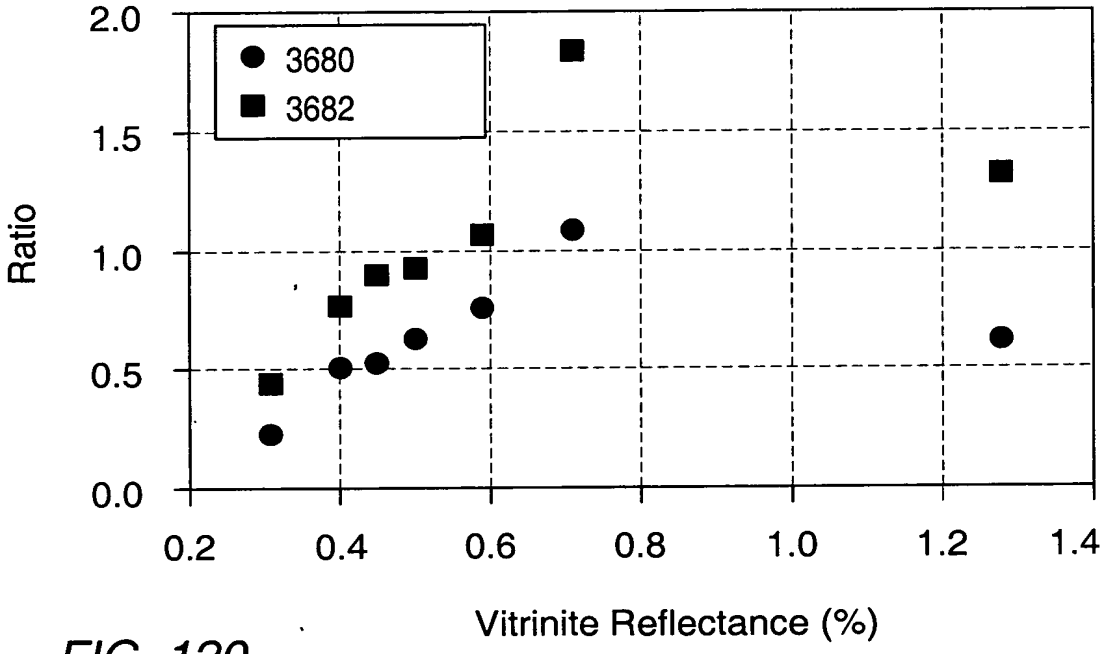


FIG. 120

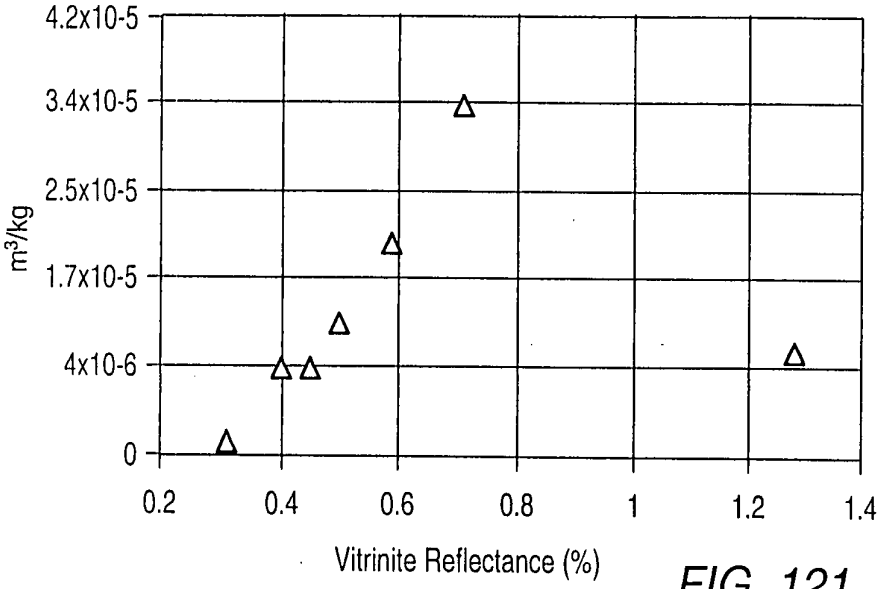


FIG. 121

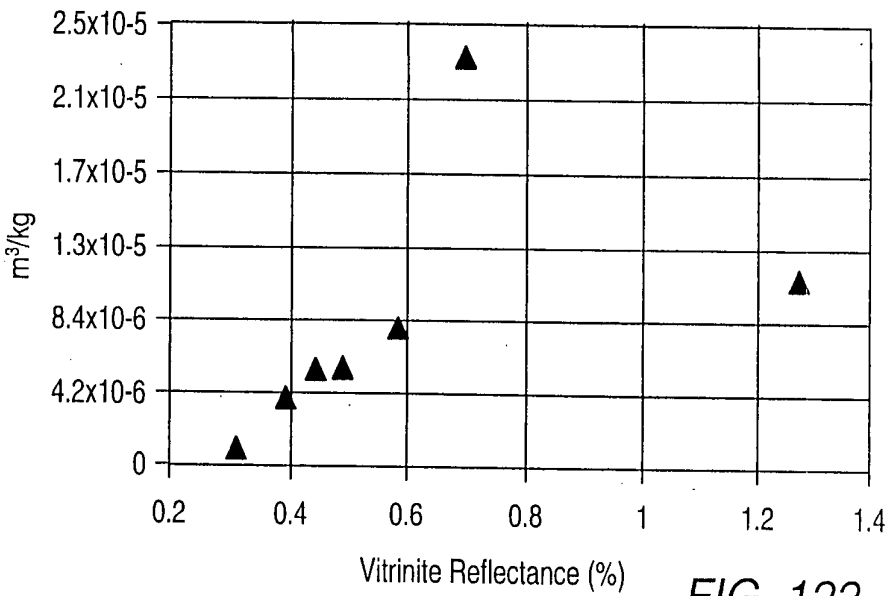


FIG. 122

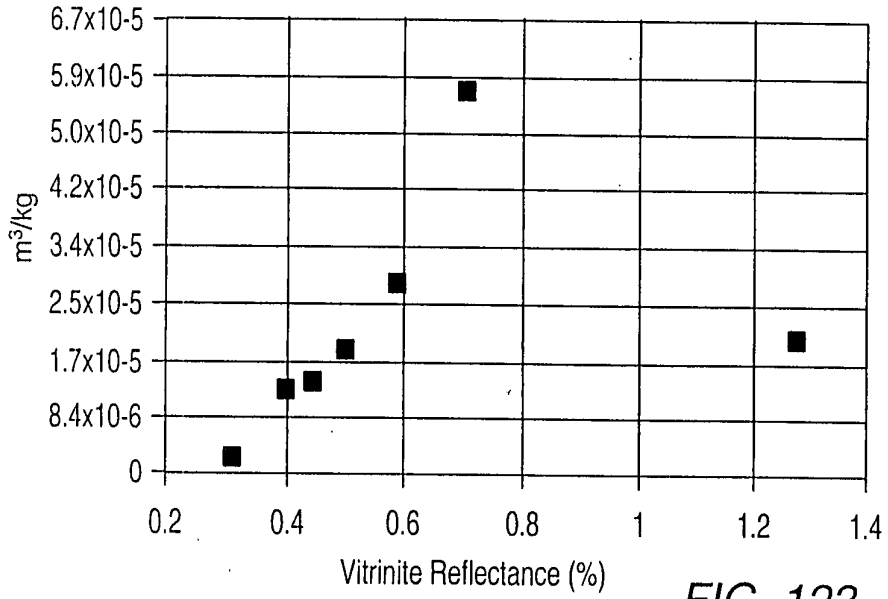


FIG. 123

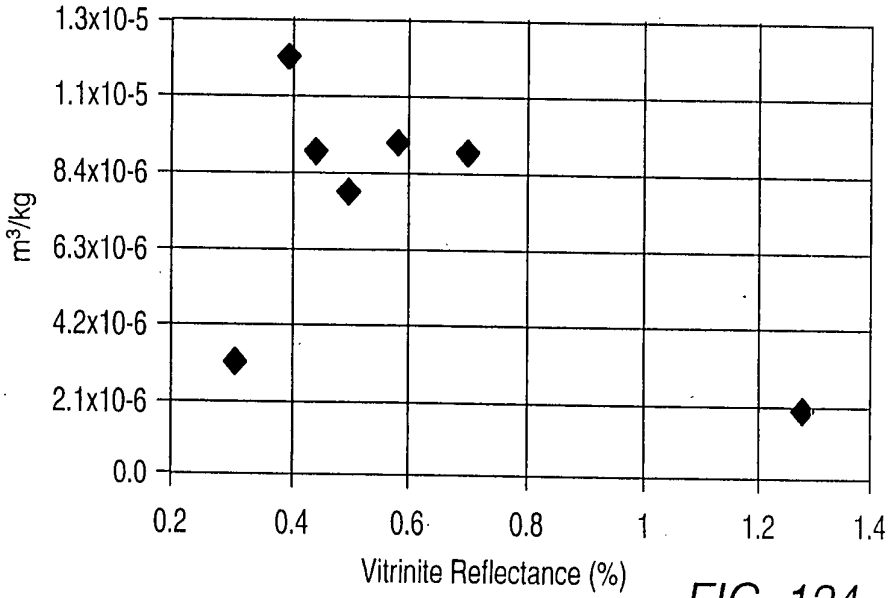


FIG. 124

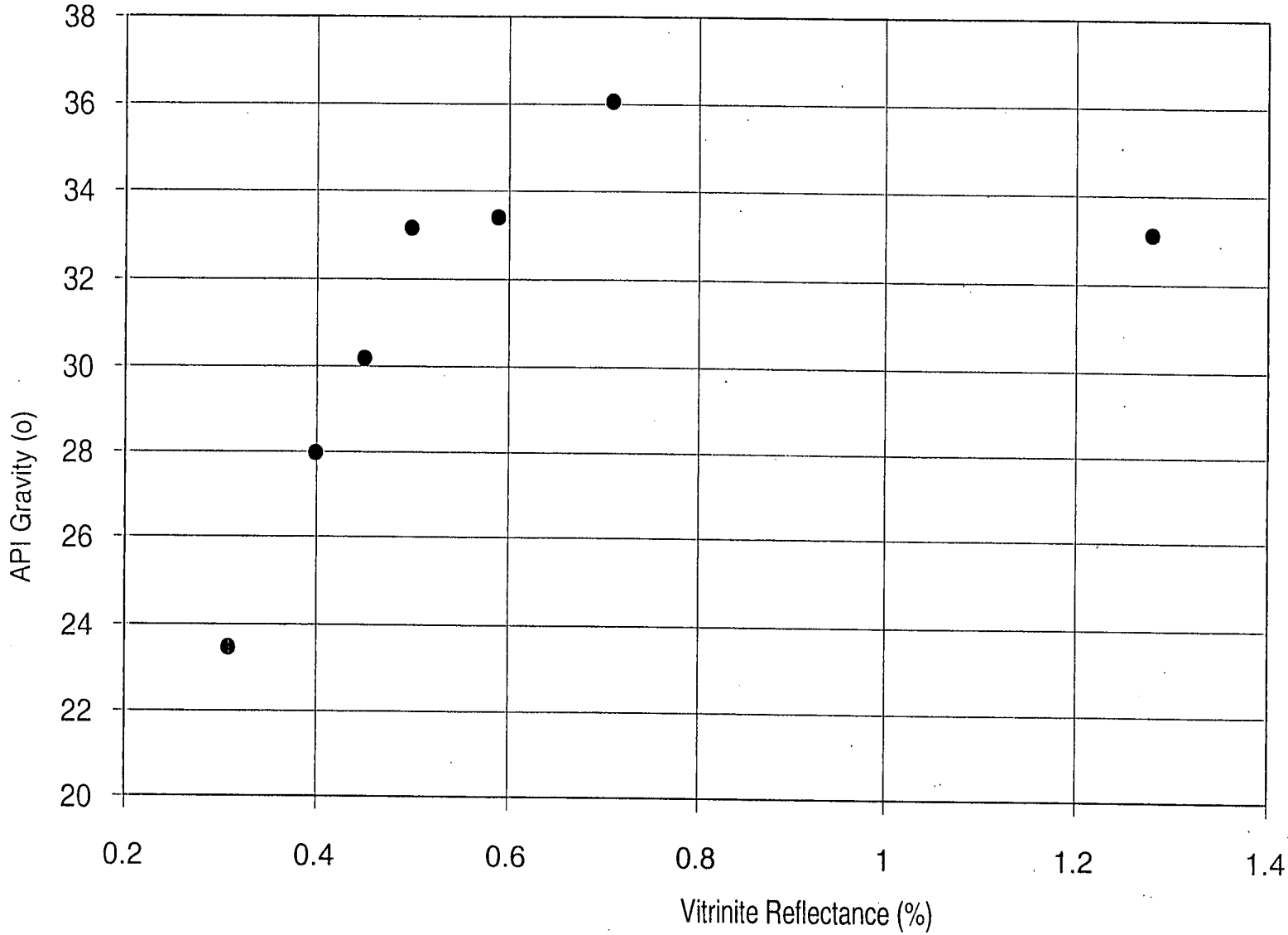


FIG. 125

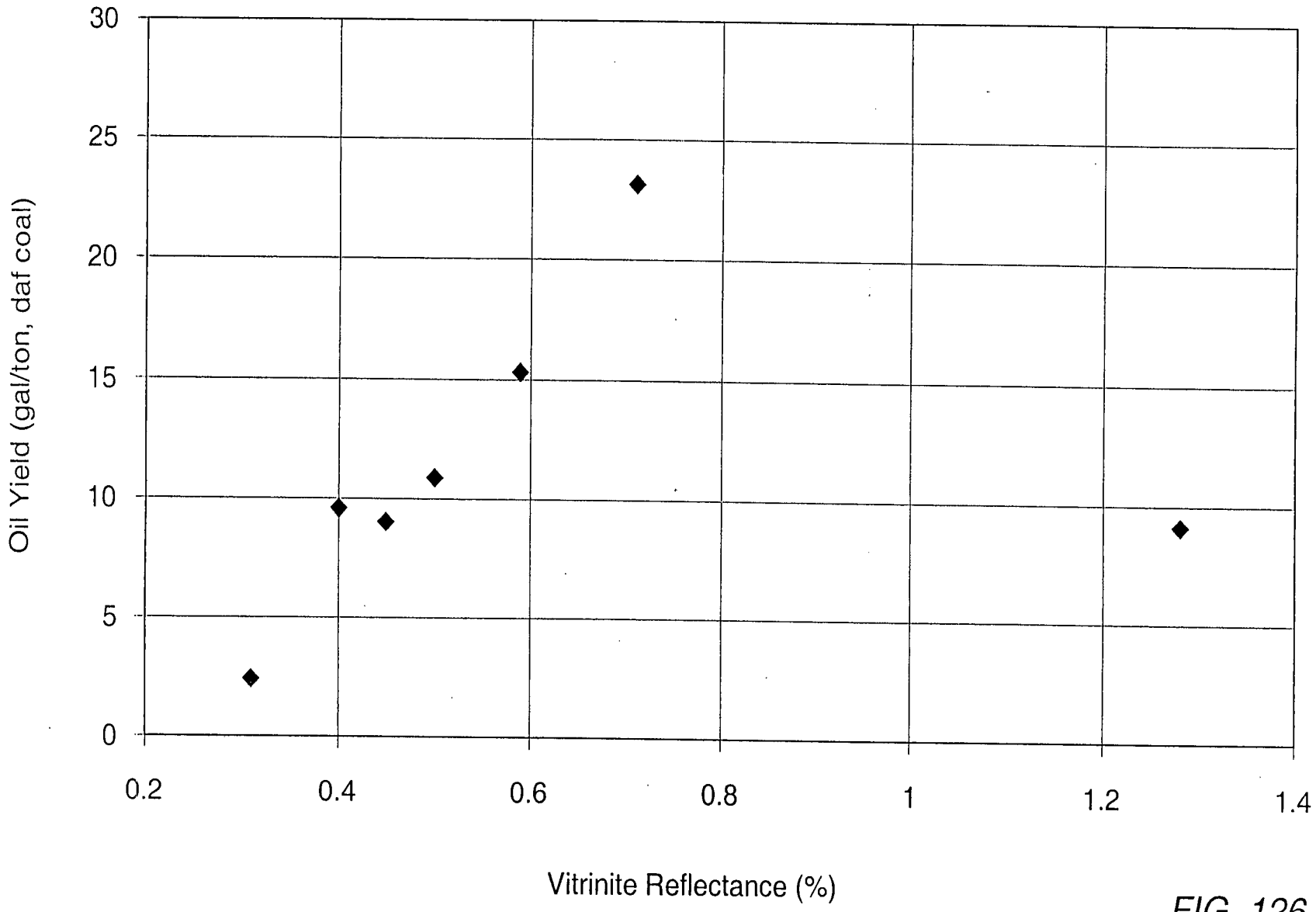

30
25
20
15
10
5
0
Oil Yield (gal/ton, daf coal)
0.2
0.4
0.6
0.8
1
1.2
1.4
Vitrinite Reflectance (%)

FIG. 126

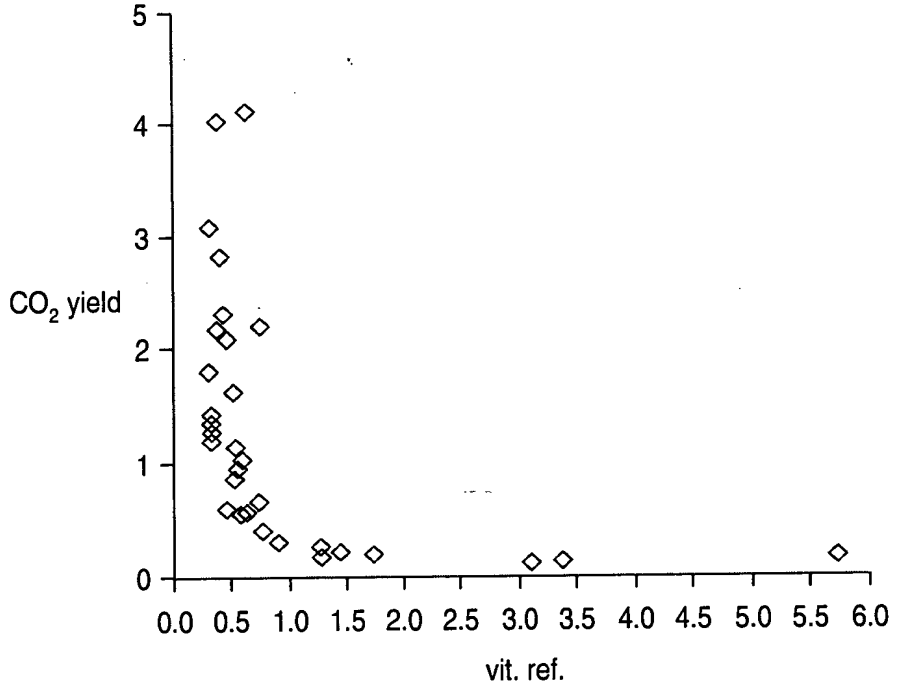


FIG. 127

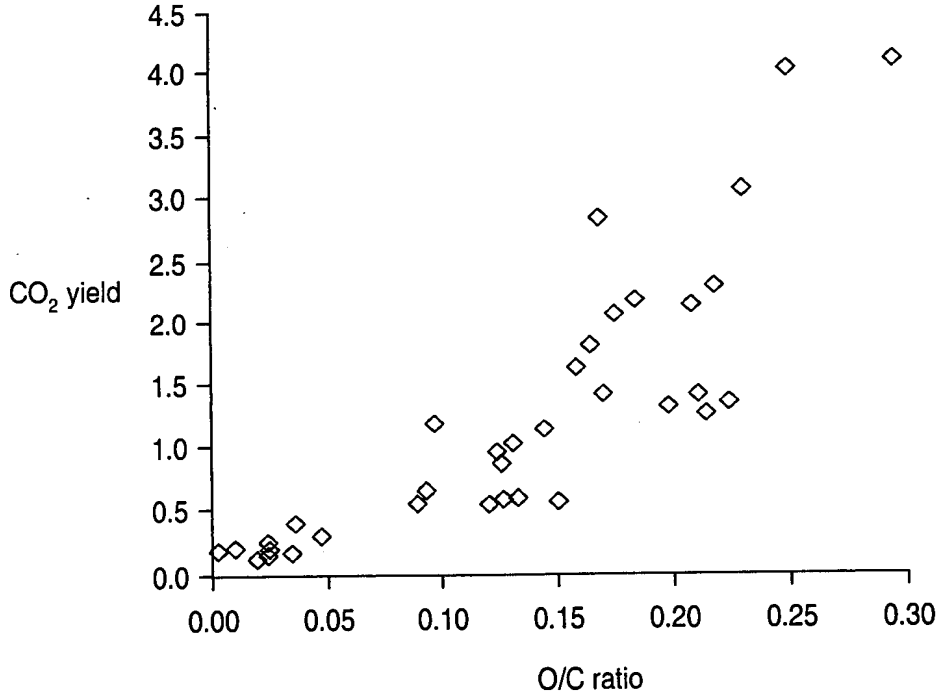


FIG. 128

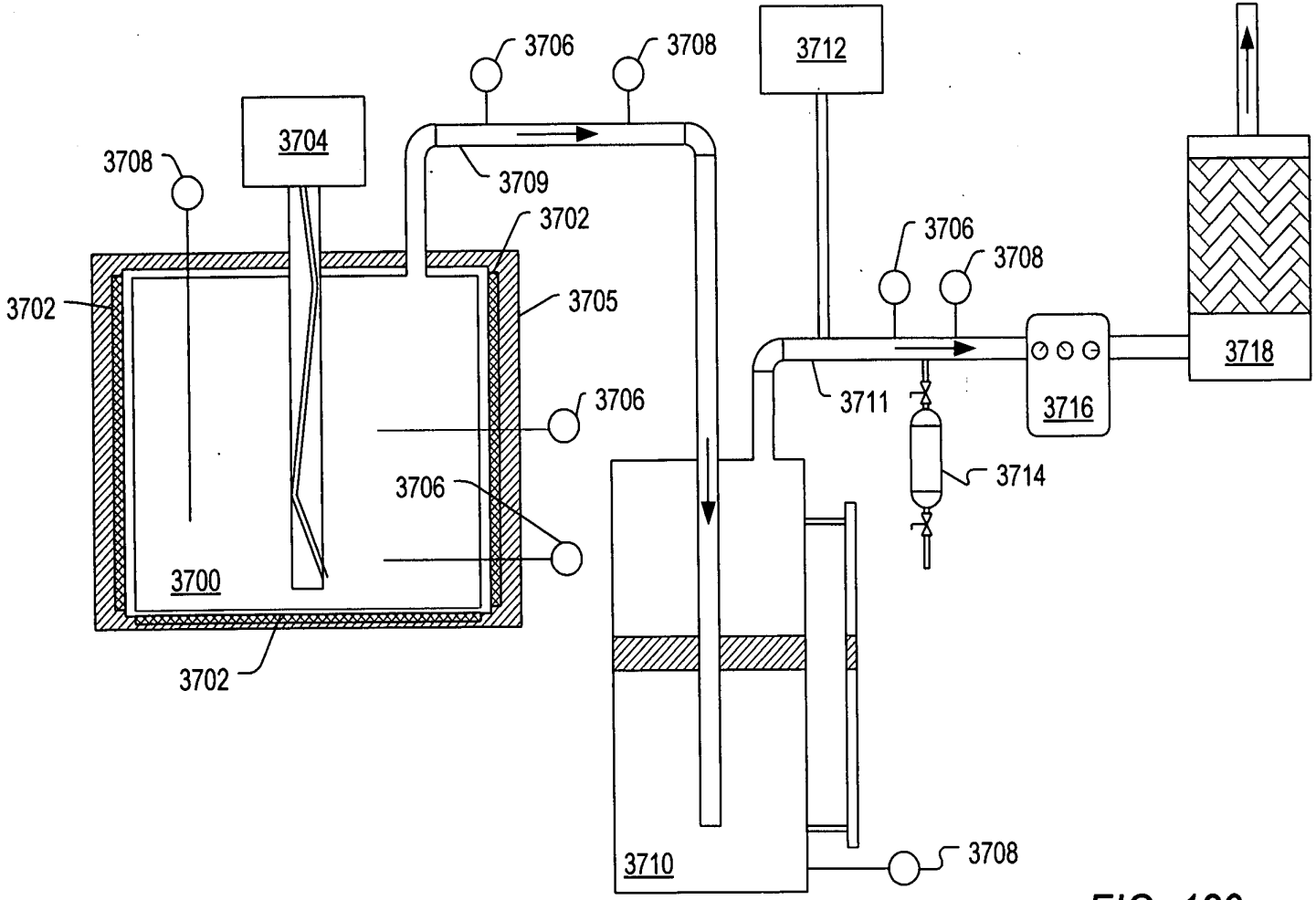


FIG. 129

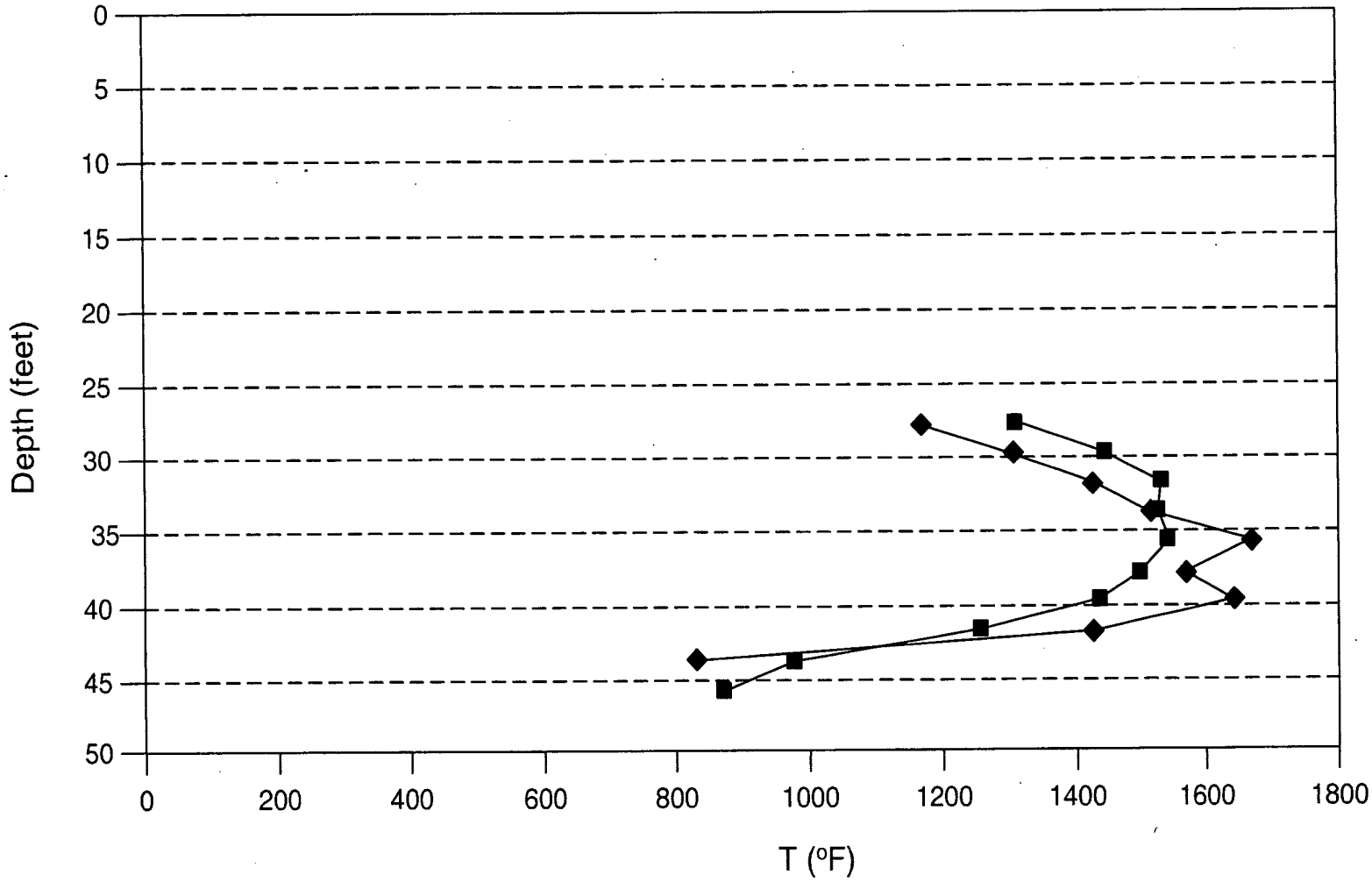
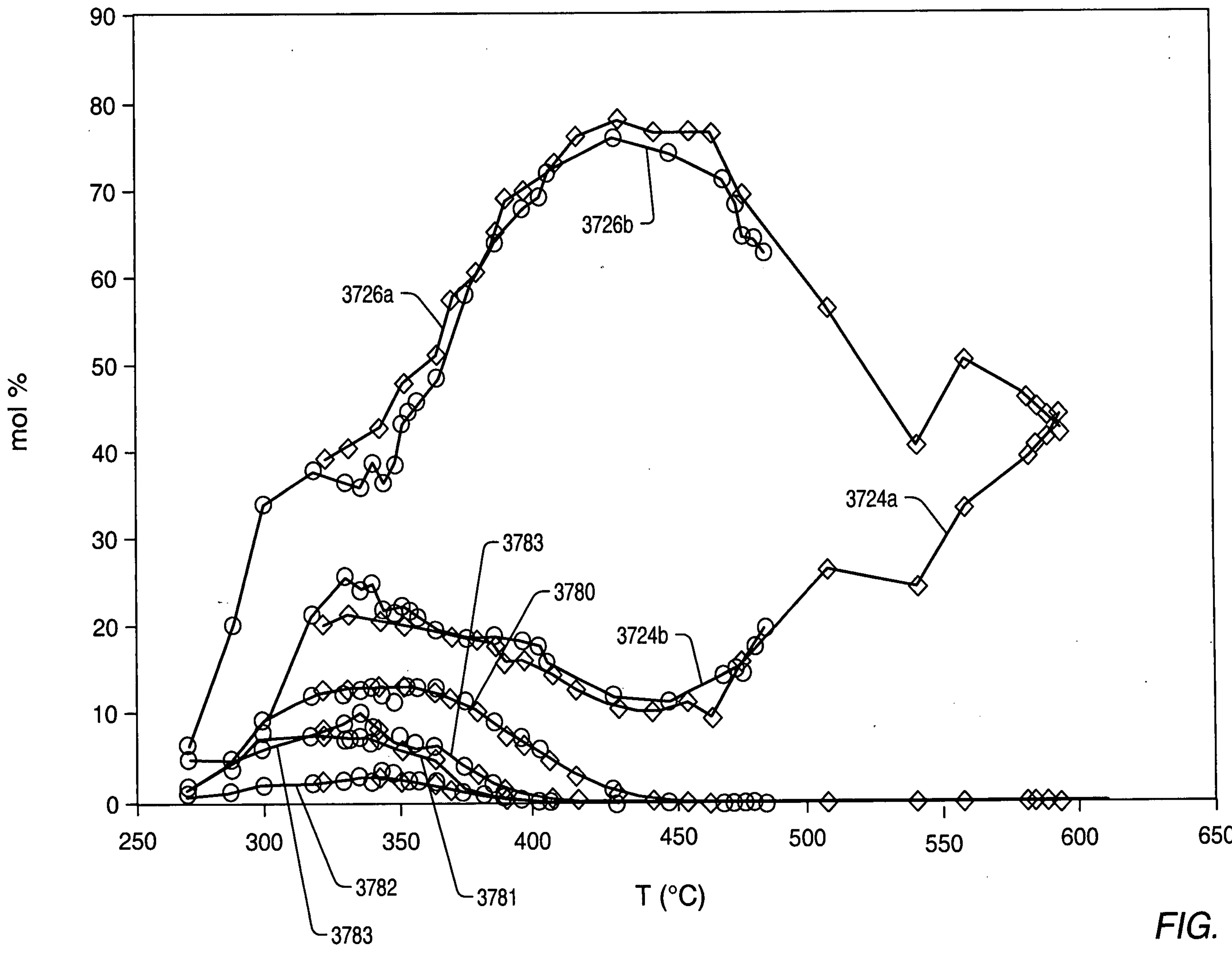

Depth (feet)
0
5
10
15
20
25
30
35
40
45
50
0
200
400
600
800
1000
1200
1400
1600
1800
T (°F)

FIG. 130



mol %
90
80
70
60
50
40
30
20
10
0
250
300
350
400
450
500
550
600
650
T (°C)
3726a
3726b
3724a
3724b
3783
3780
3782
3781
3783

FIG. 131

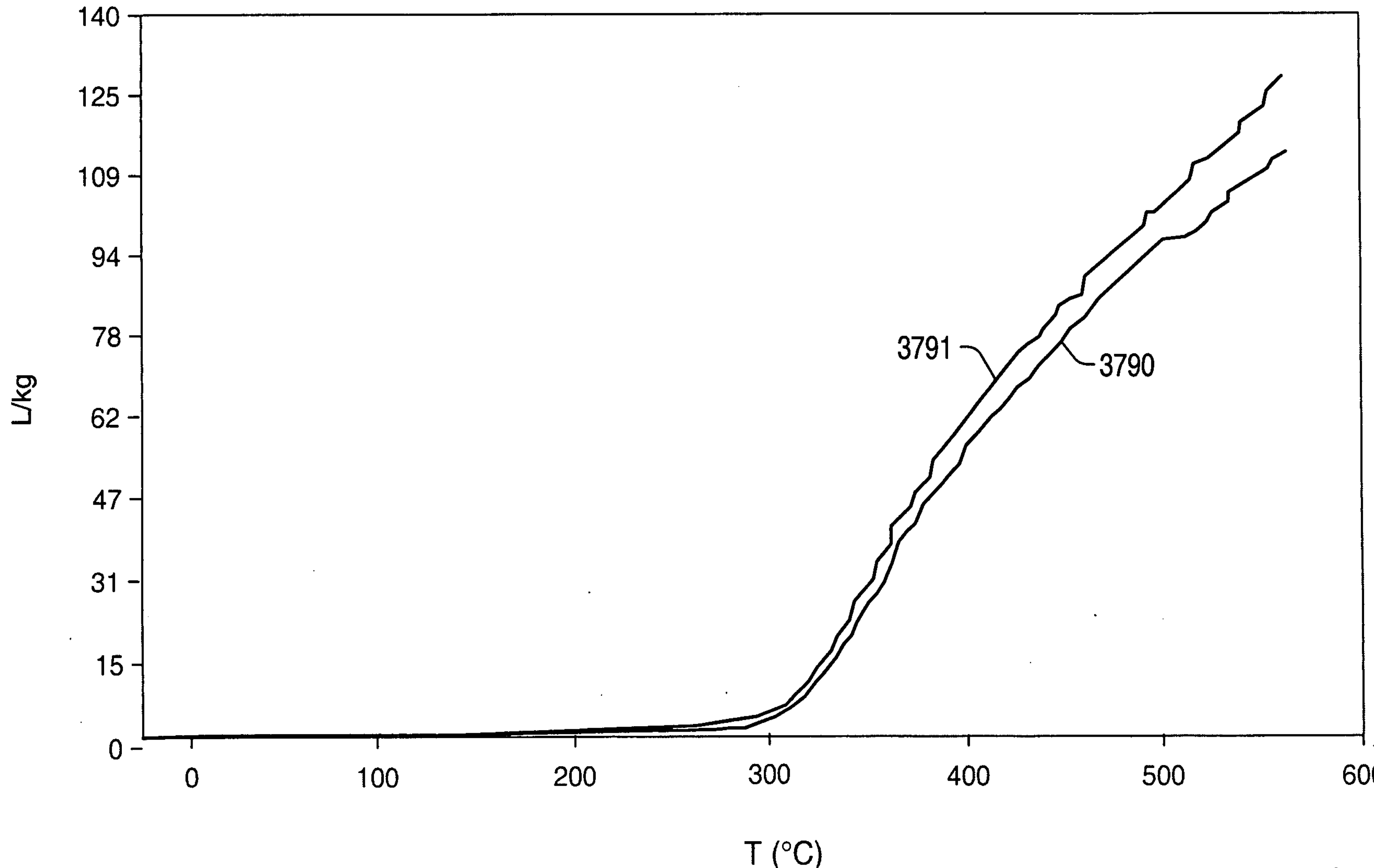


FIG. 132

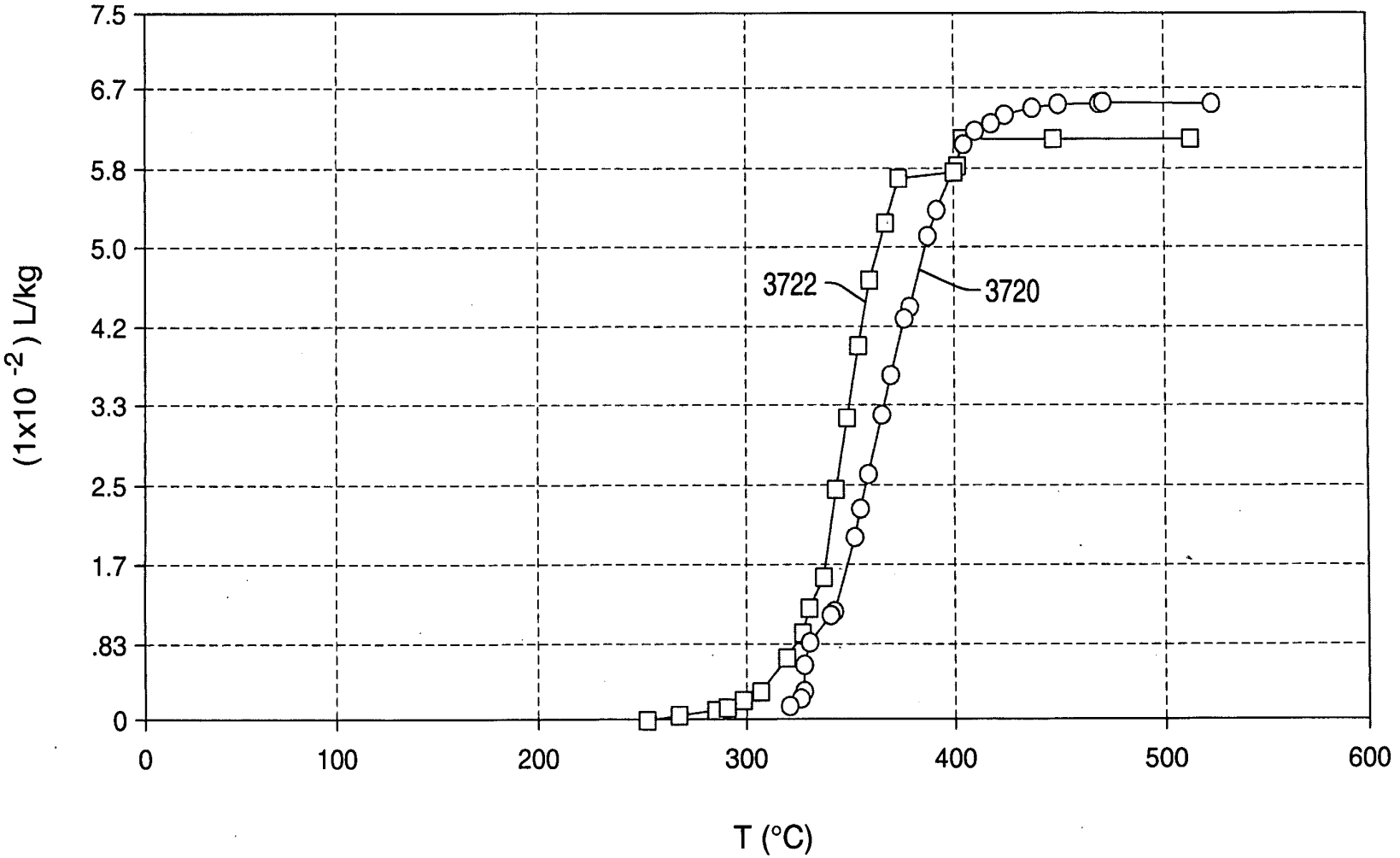

7.5
6.7
5.8
5.0
4.2
3.3
2.5
1.7
.83
0
(1x10 -2) L/kg
0
100
200
300
400
500
600
T (°C)
3722
3720

FIG. 133

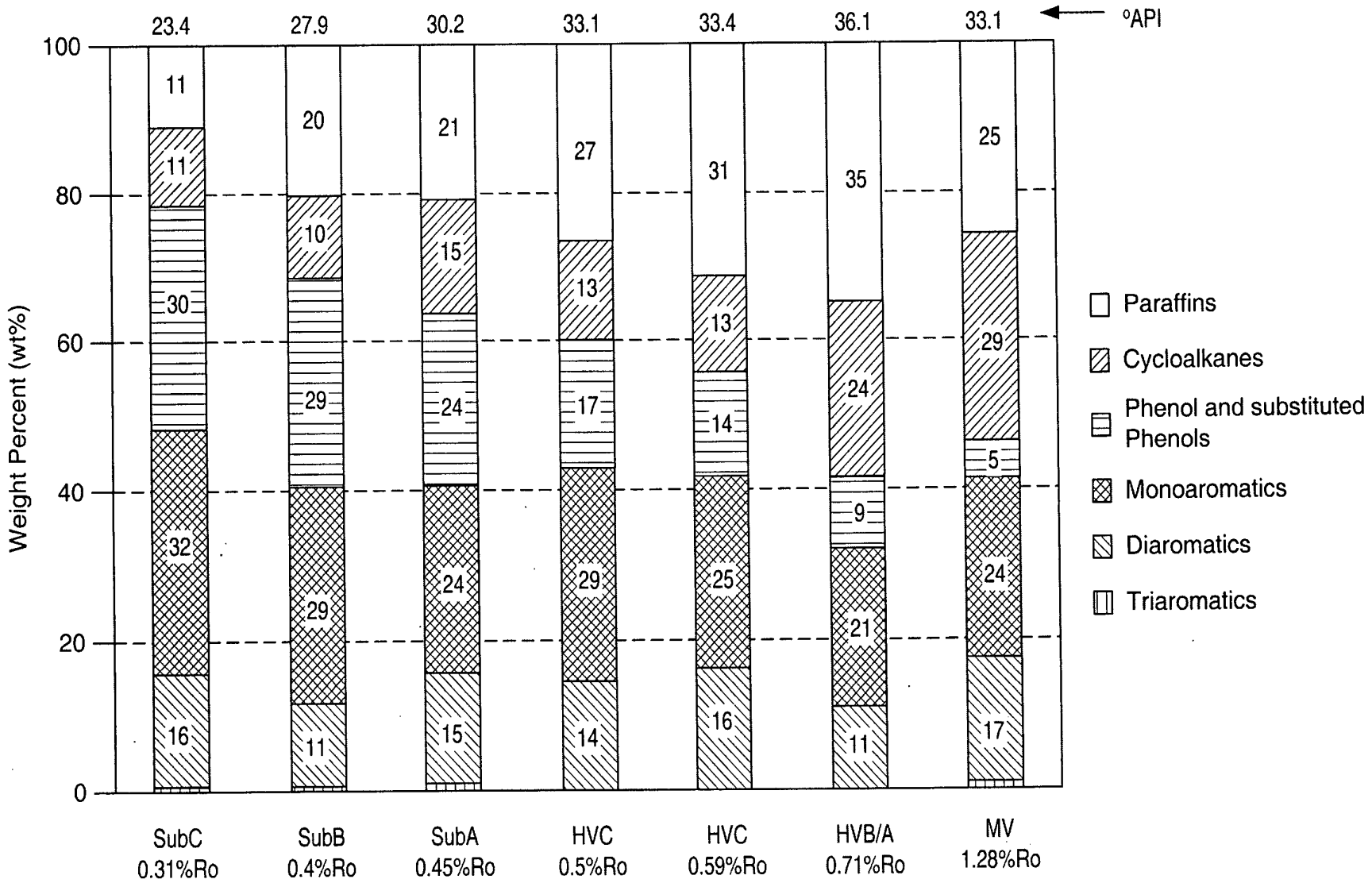

°API
23.4
27.9
30.2
33.1
33.4
36.1
33.1
Weight Percent (wt%)
100
80
60
40
20
0
11
11
30
32
16
20
10
29
29
11
21
15
24
24
15
27
13
17
29
14
31
13
14
25
16
35
24
9
21
11
25
29
5
24
17
SubC 0.31%Ro
SubB 0.4%Ro
SubA 0.45%Ro
HVC 0.5%Ro
HVC 0.59%Ro
HVB/A 0.71%Ro
MV 1.28%Ro
Paraffins
Cycloalkanes
Phenol and substituted Phenols
Monoaromatics
Diaromatics
Triaromatics

FIG. 134

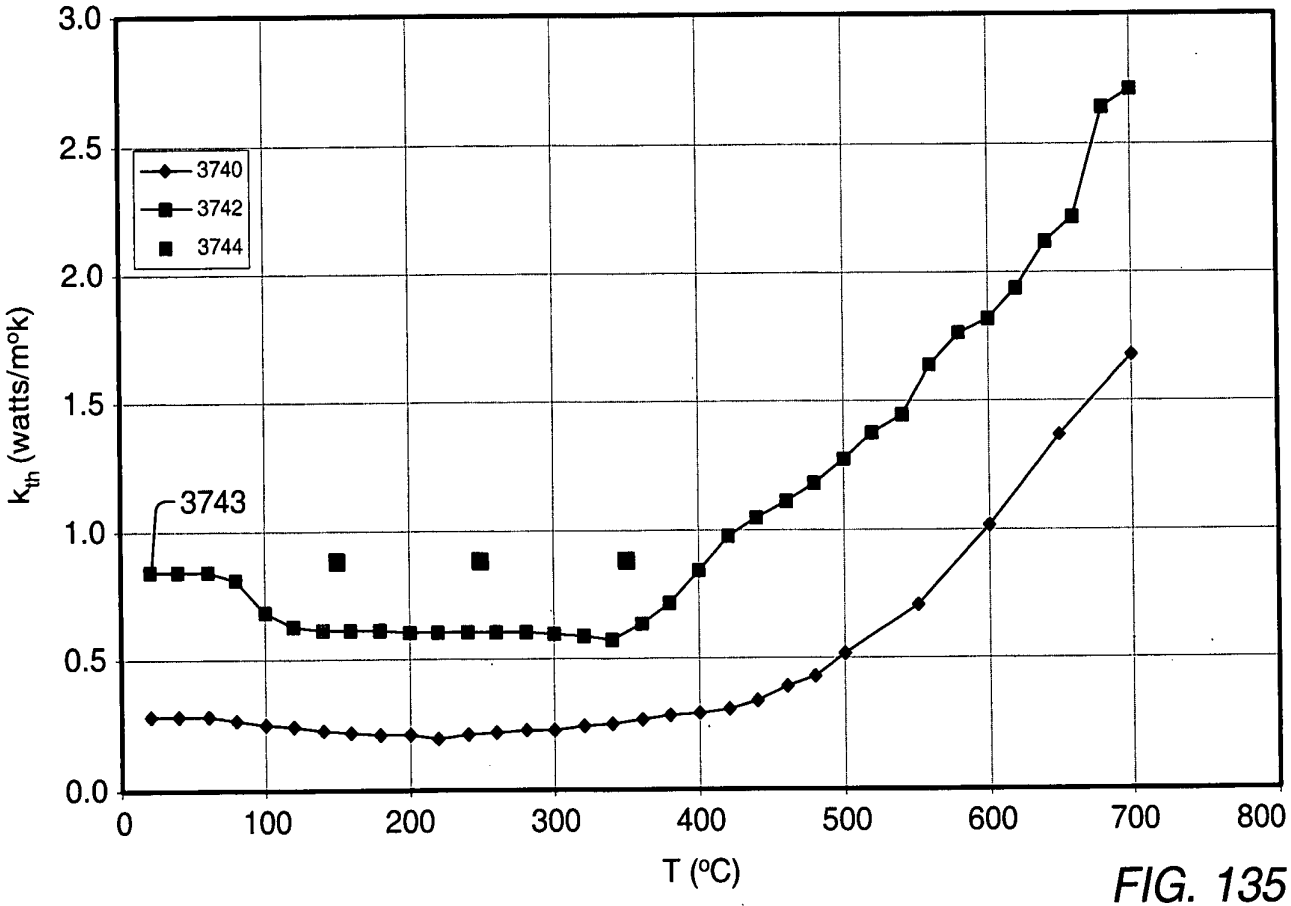

3.0
2.5
2.0
1.5
1.0
0.5
0.0
k_{th} (watts/m°k)
3740
3742
3744
3743
0
100
200
300
400
500
600
700
800
T (°C)

FIG. 135

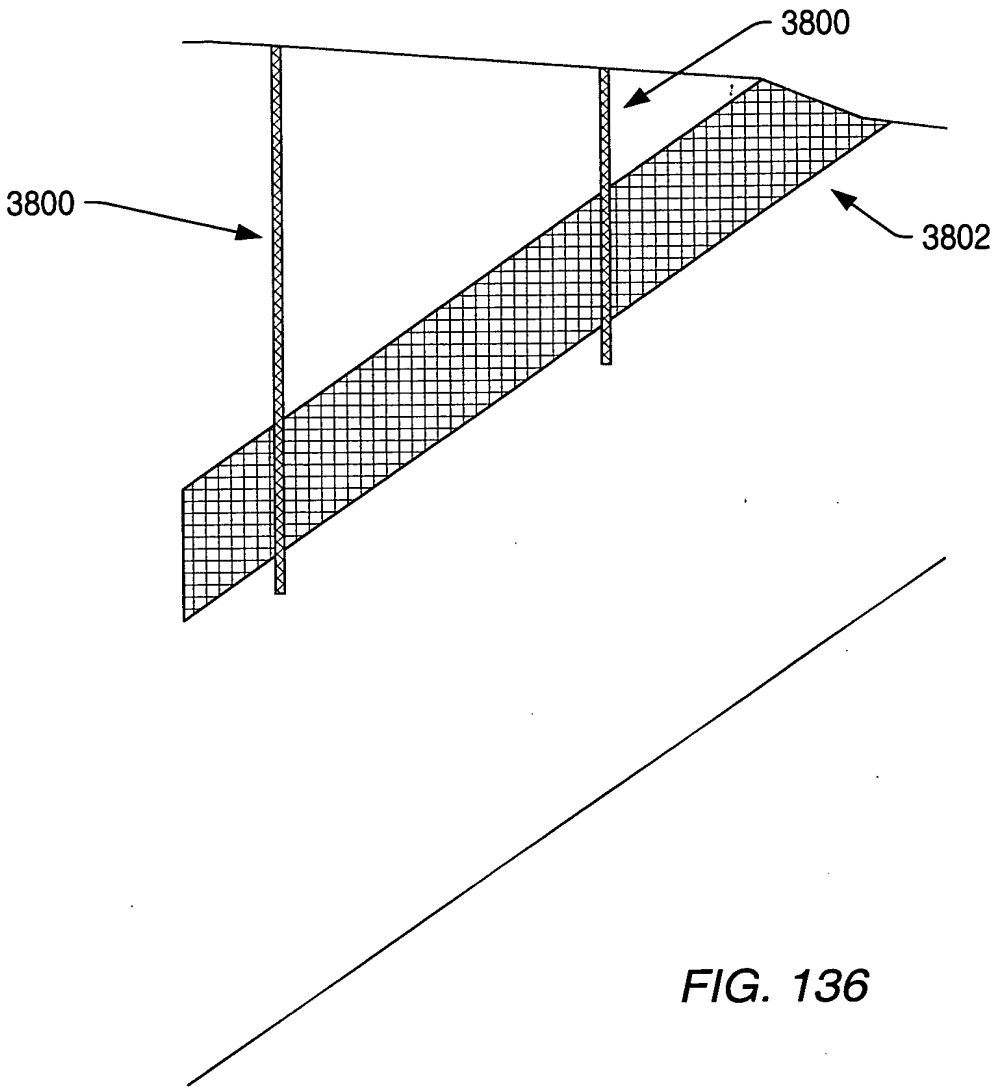


FIG. 136

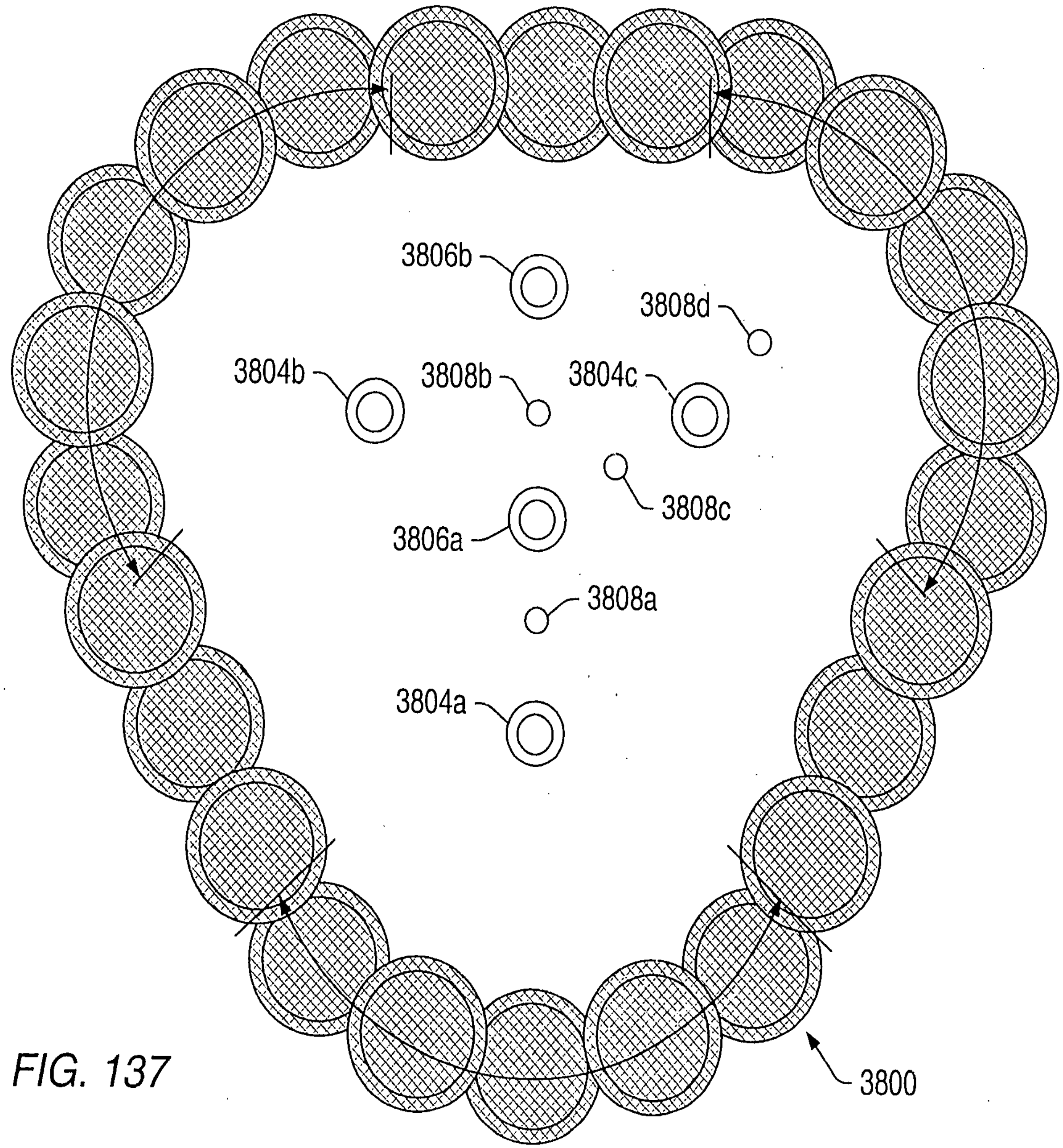


FIG. 137

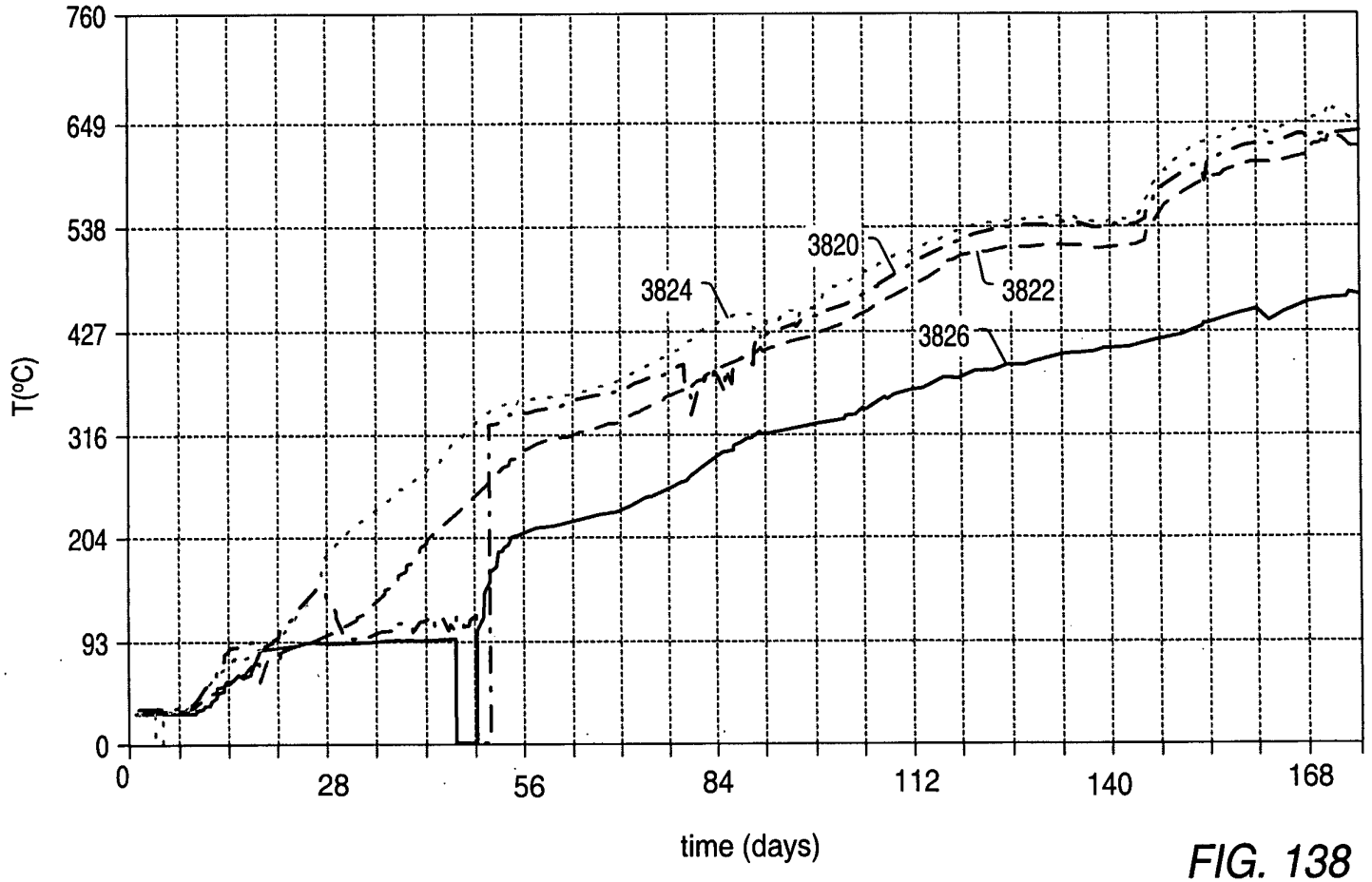


FIG. 138

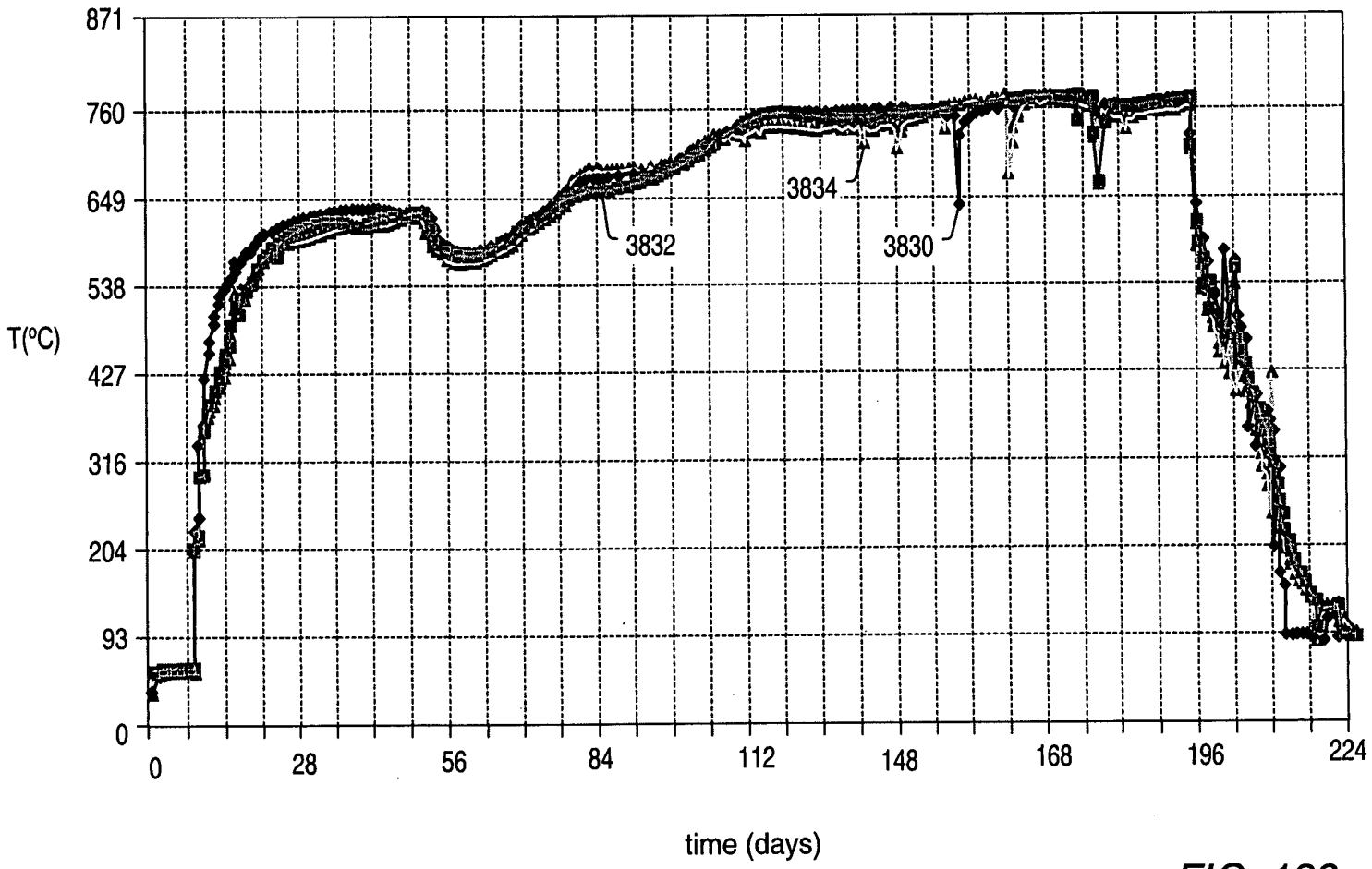

871
760
649
538
427
316
204
93
0
T(°C)
0
28
56
84
112
148
168
196
224
time (days)
3832
3834
3830

FIG. 139

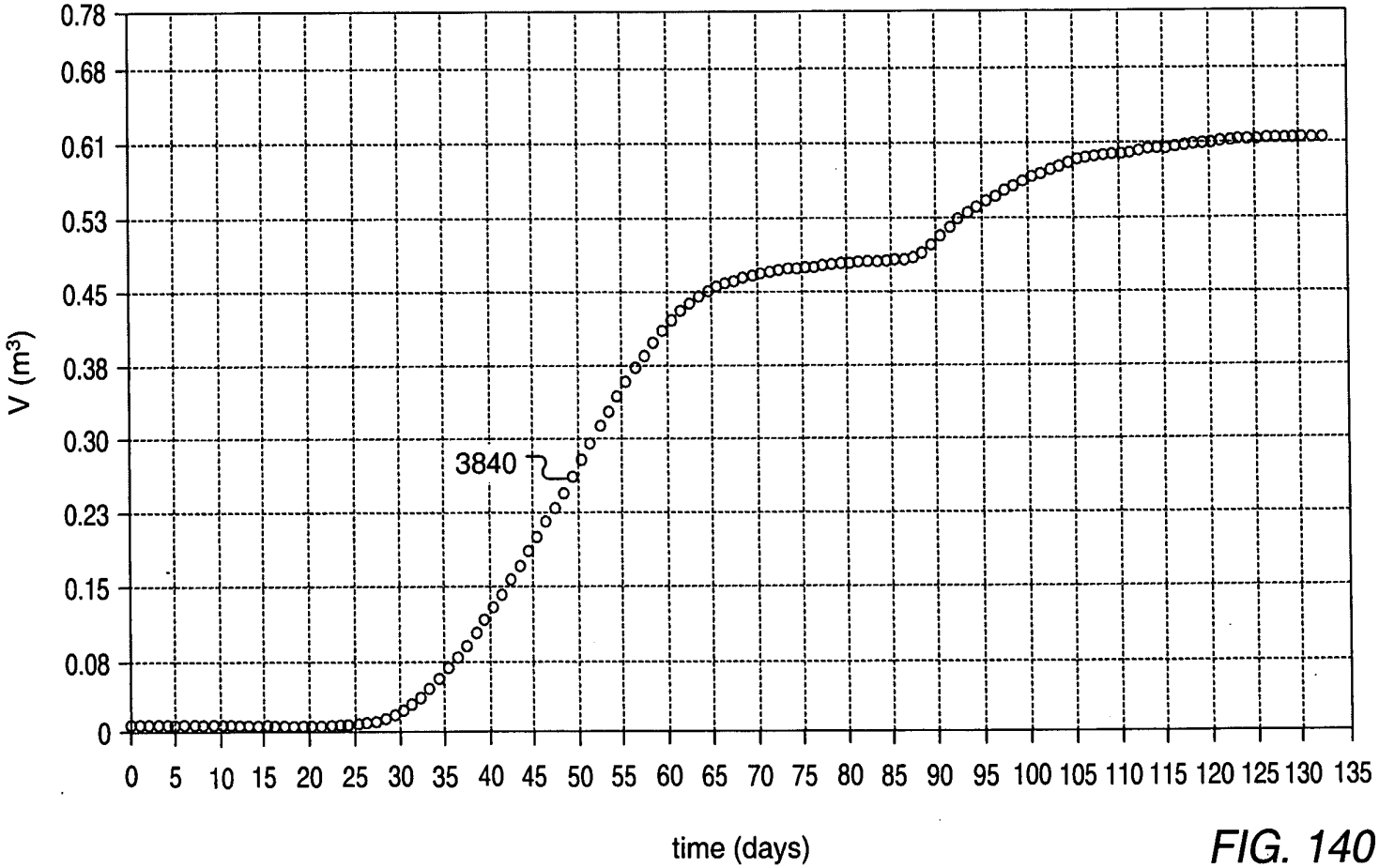

0.78
0.68
0.61
0.53
0.45
0.38
0.30
0.23
0.15
0.08
0
V (m³)
3840
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135
time (days)

FIG. 140

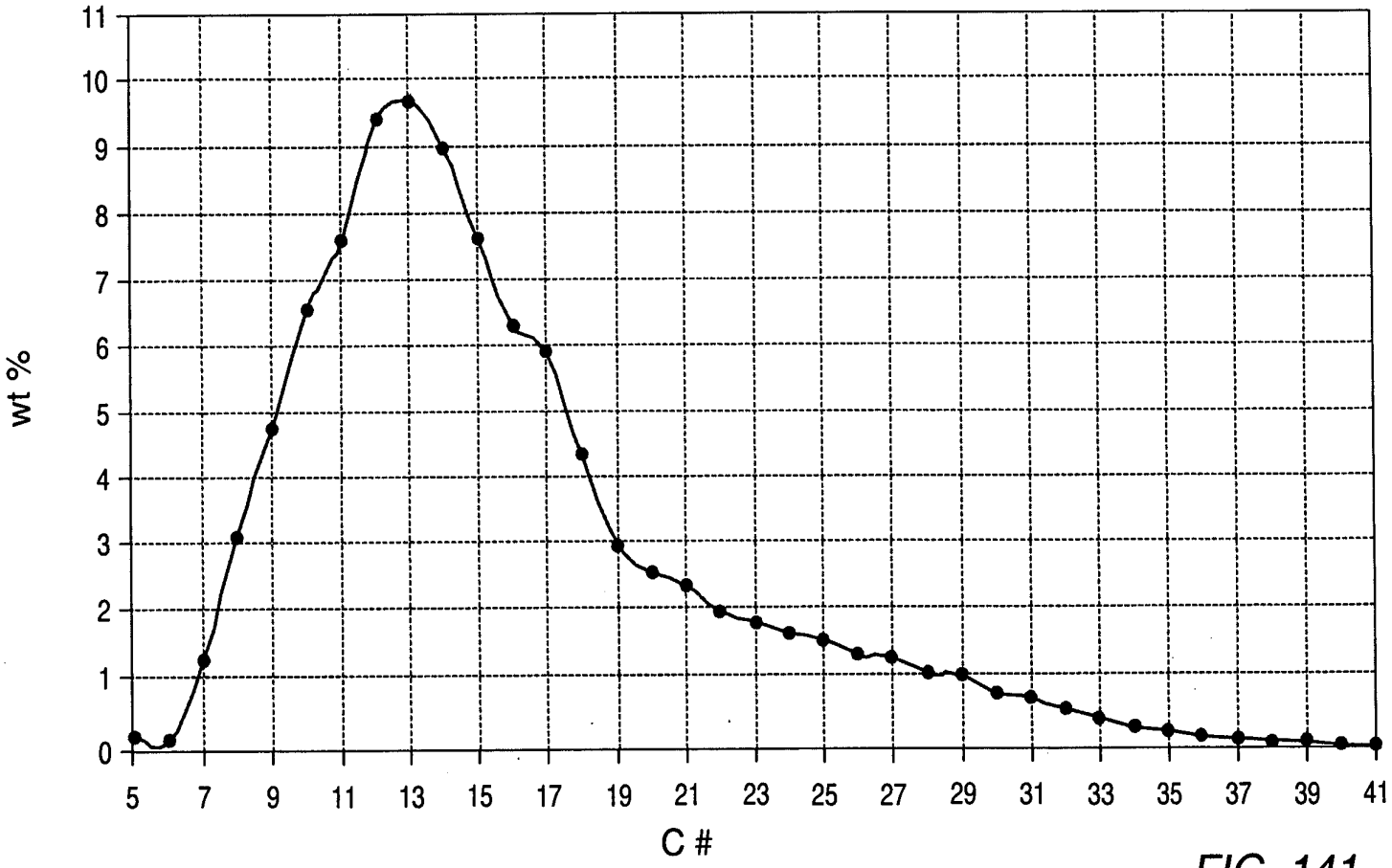


FIG. 141

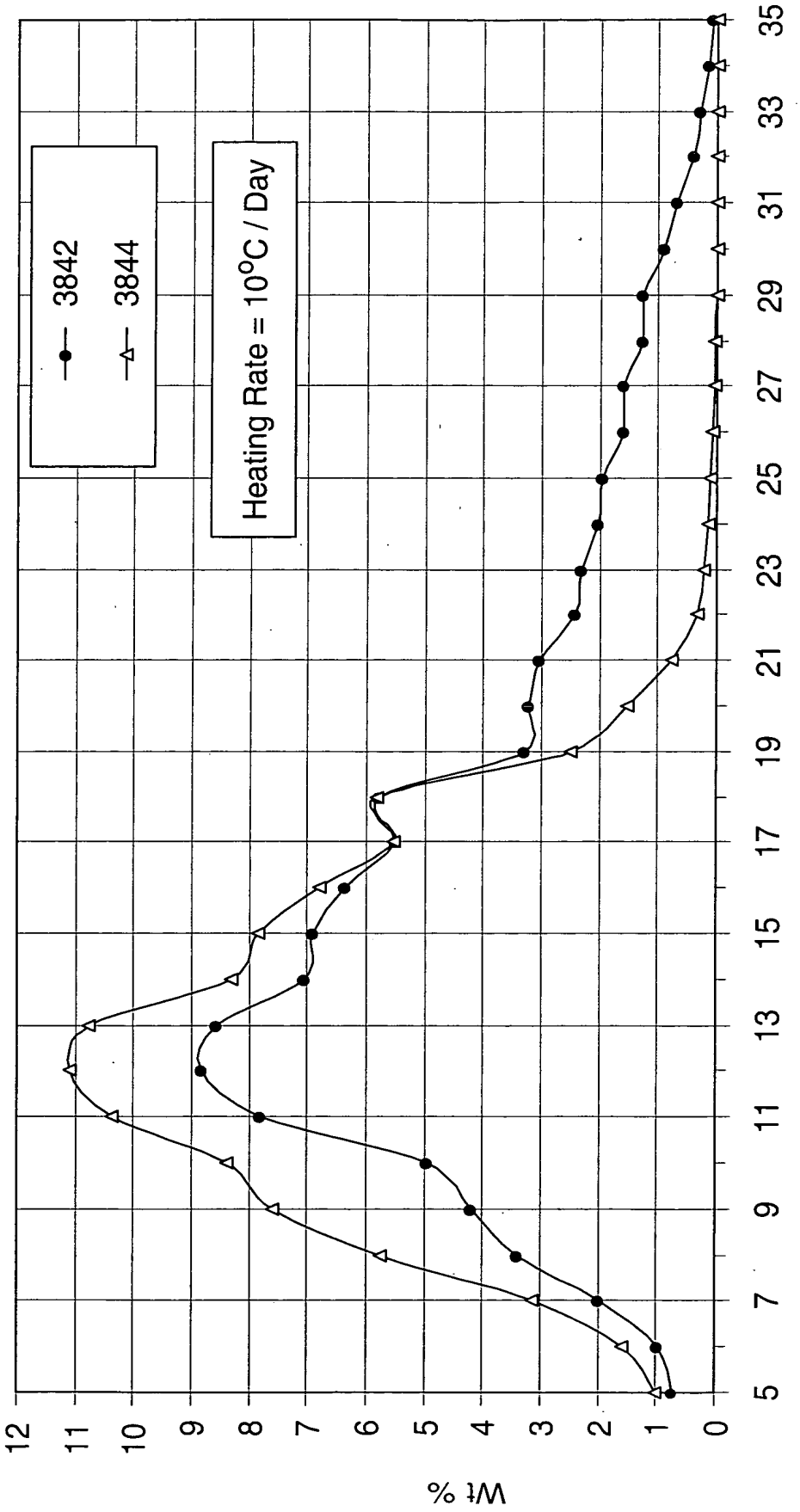

3842
3844
Heating Rate = 10°C / Day
Wt %
Carbon Number
0
1
2
3
4
5
6
7
8
9
10
11
12
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35

FIG. 142

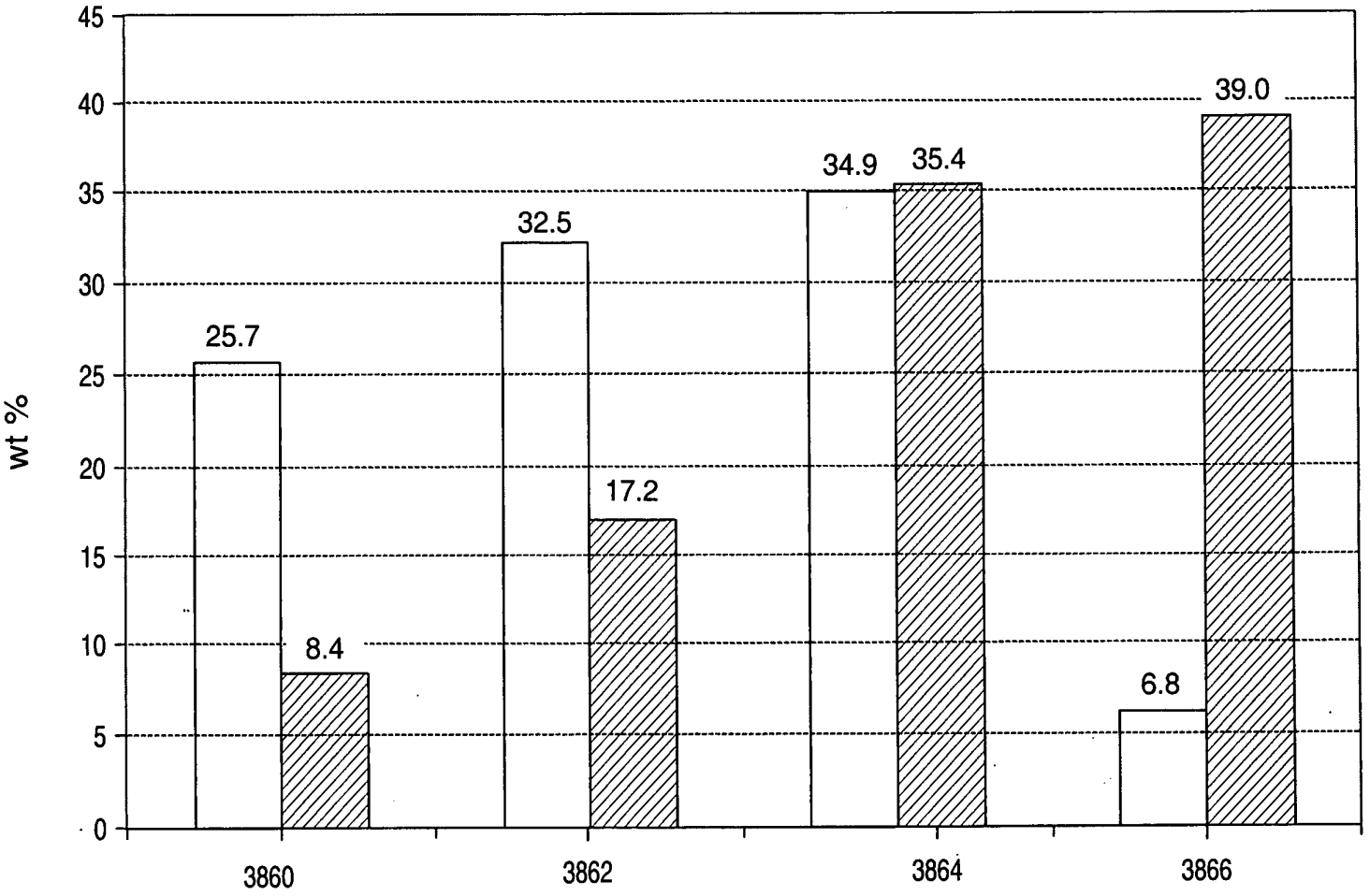

45
40
35
30
25
20
15
10
5
0
wt %
25.7
8.4
32.5
17.2
34.9
35.4
6.8
39.0
3860
3862
3864
3866

FIG. 143

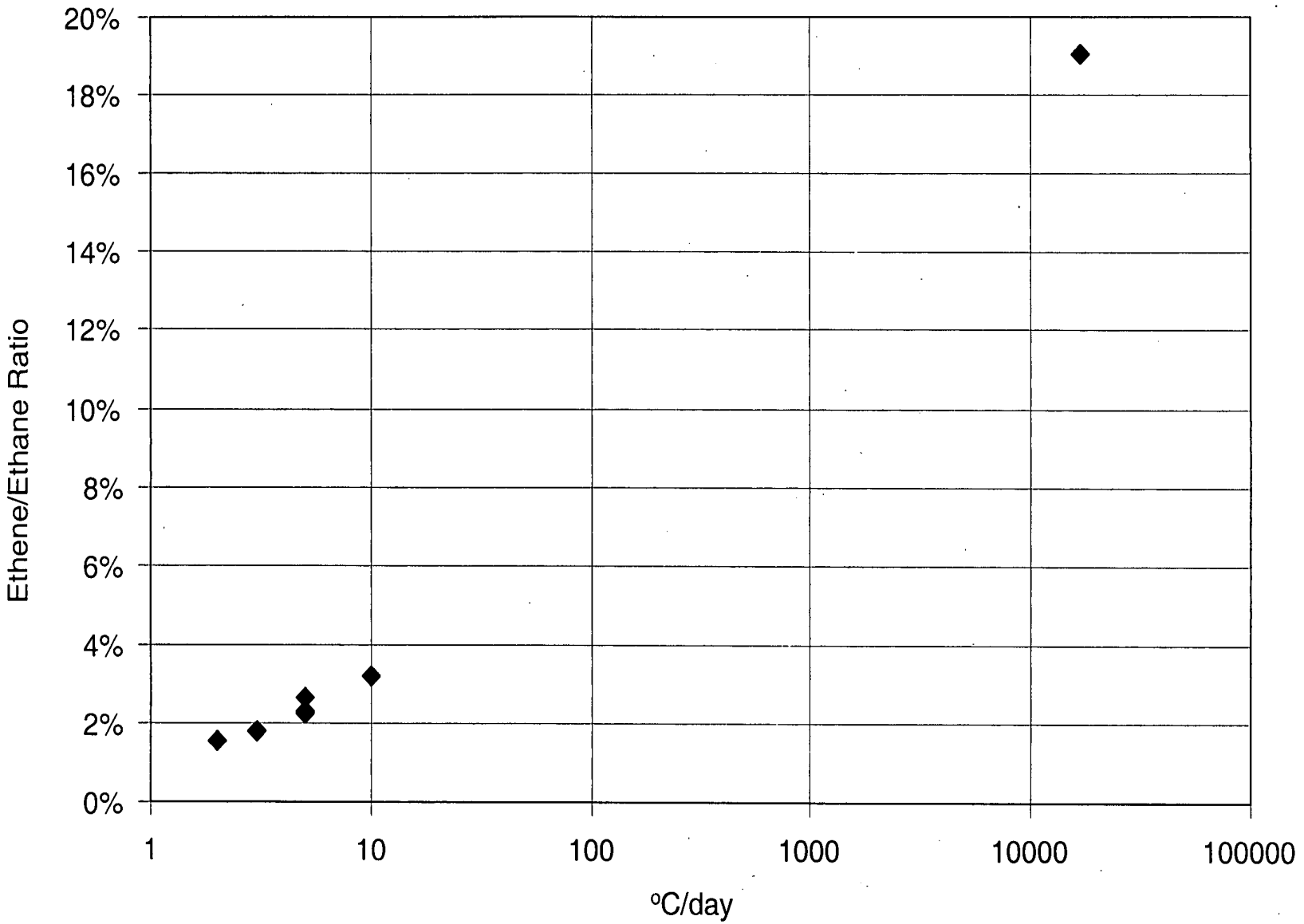

20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Ethene/Ethane Ratio
1
10
100
1000
10000
100000
°C/day

FIG. 144

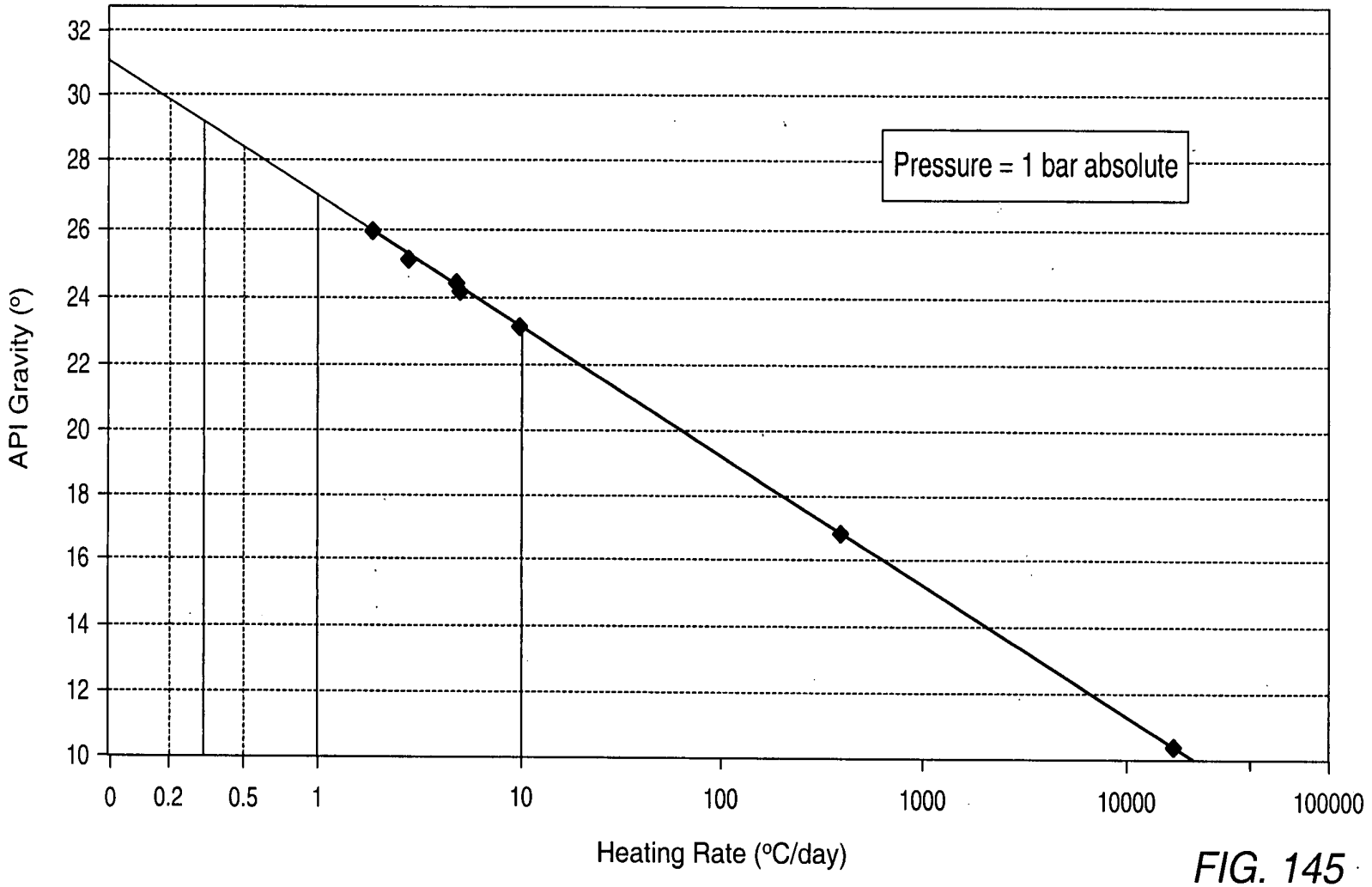


FIG. 145

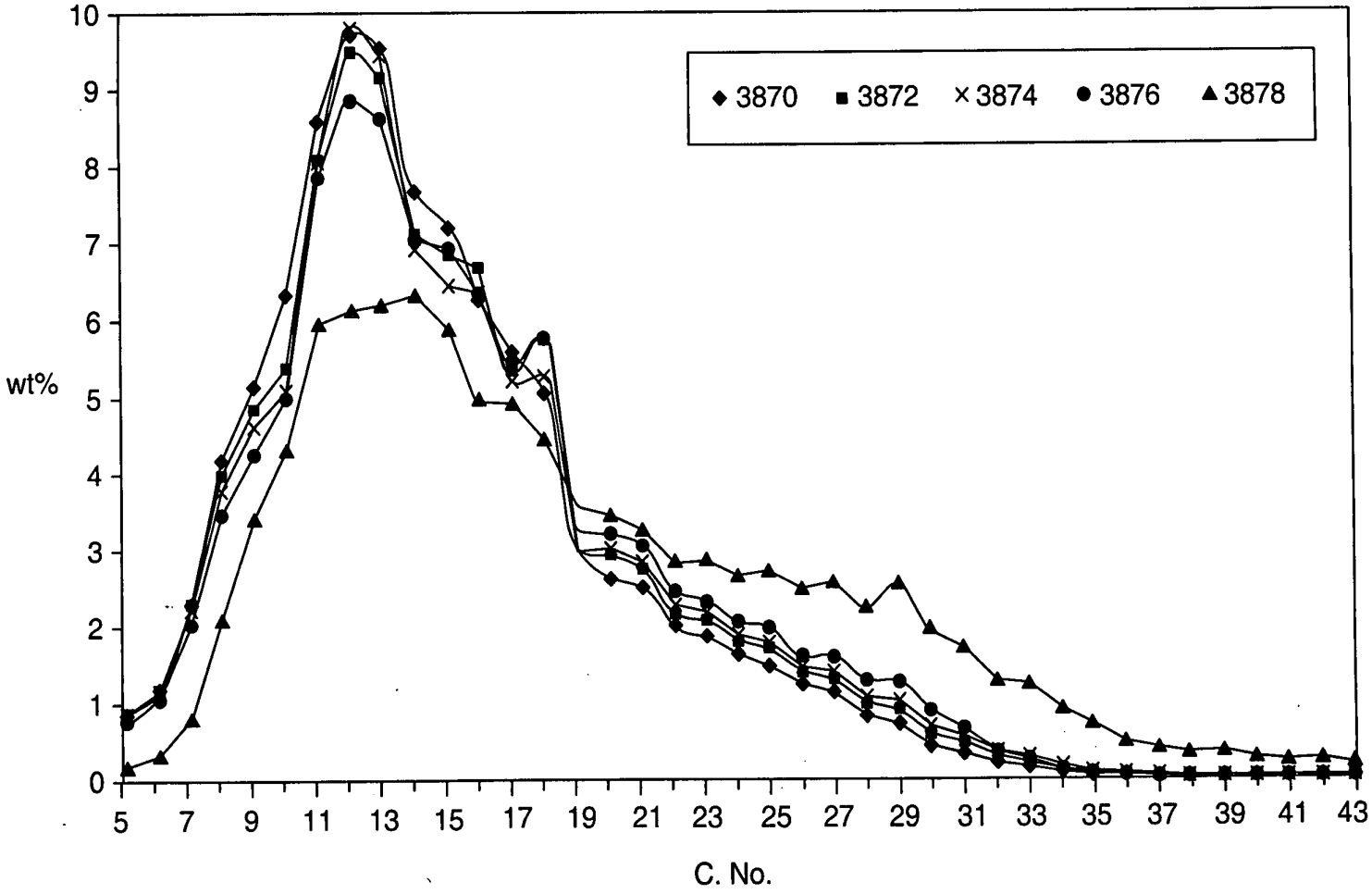

◆ 3870
■ 3872
× 3874
● 3876
▲ 3878
wt%
C. No.
0
1
2
3
4
5
6
7
8
9
10
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43

FIG. 146

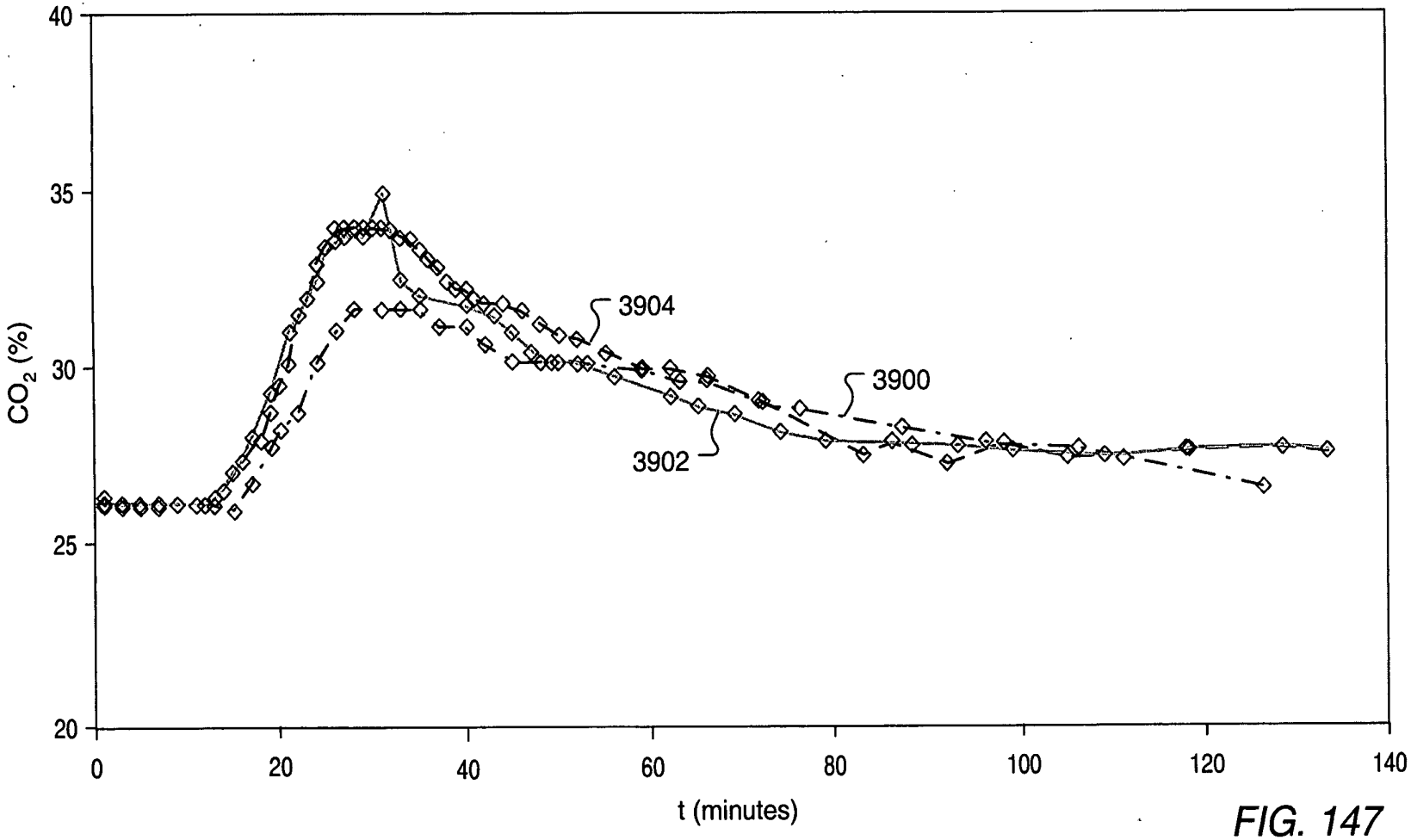

40
35
30
25
20
CO_2 (%)
0
20
40
60
80
100
120
140
t (minutes)
3904
3900
3902

FIG. 147

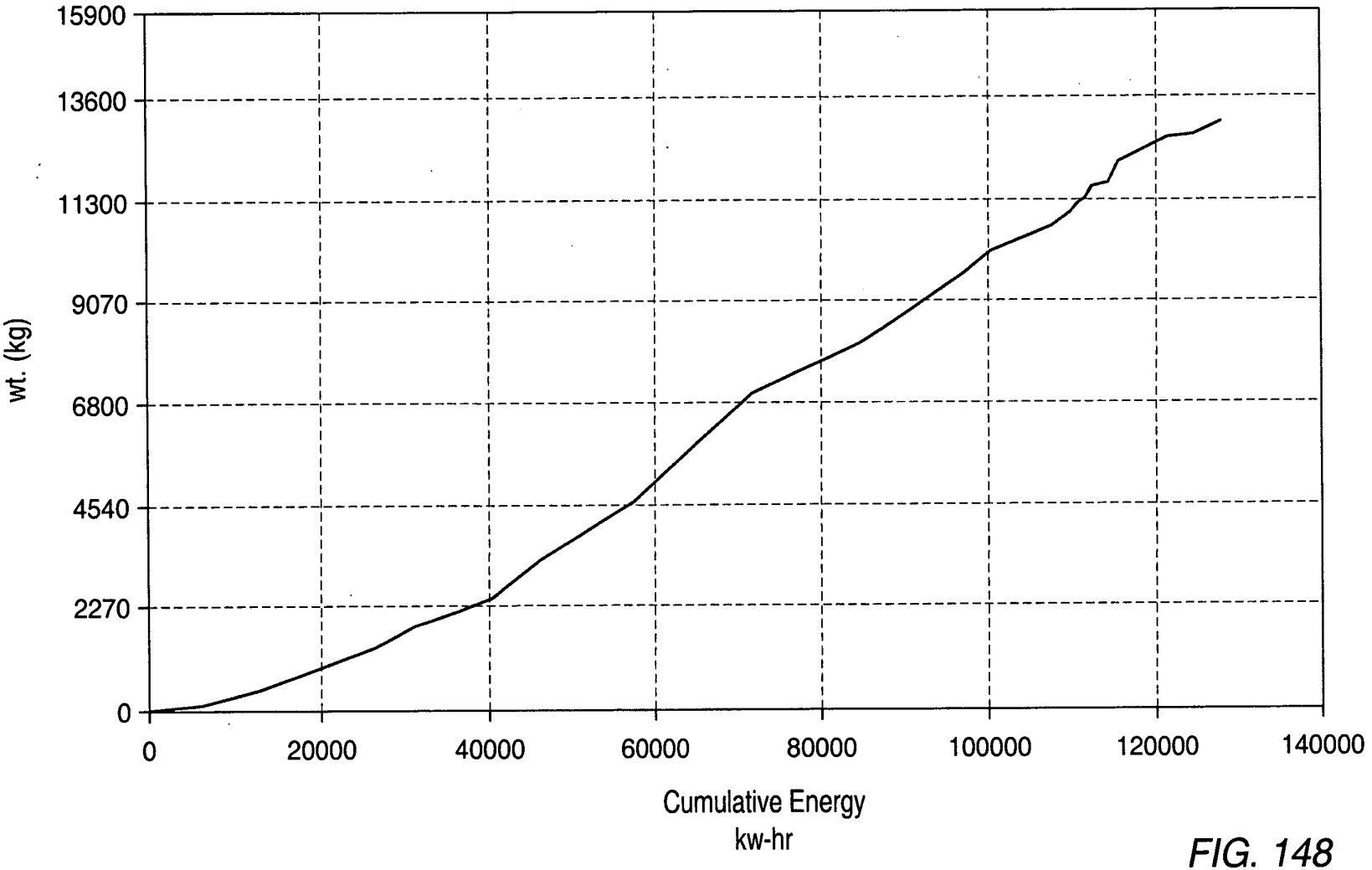

15900
13600
11300
9070
6800
4540
2270
0
wt. (kg)
0
20000
40000
60000
80000
100000
120000
140000
Cumulative Energy
kw-hr

FIG. 148

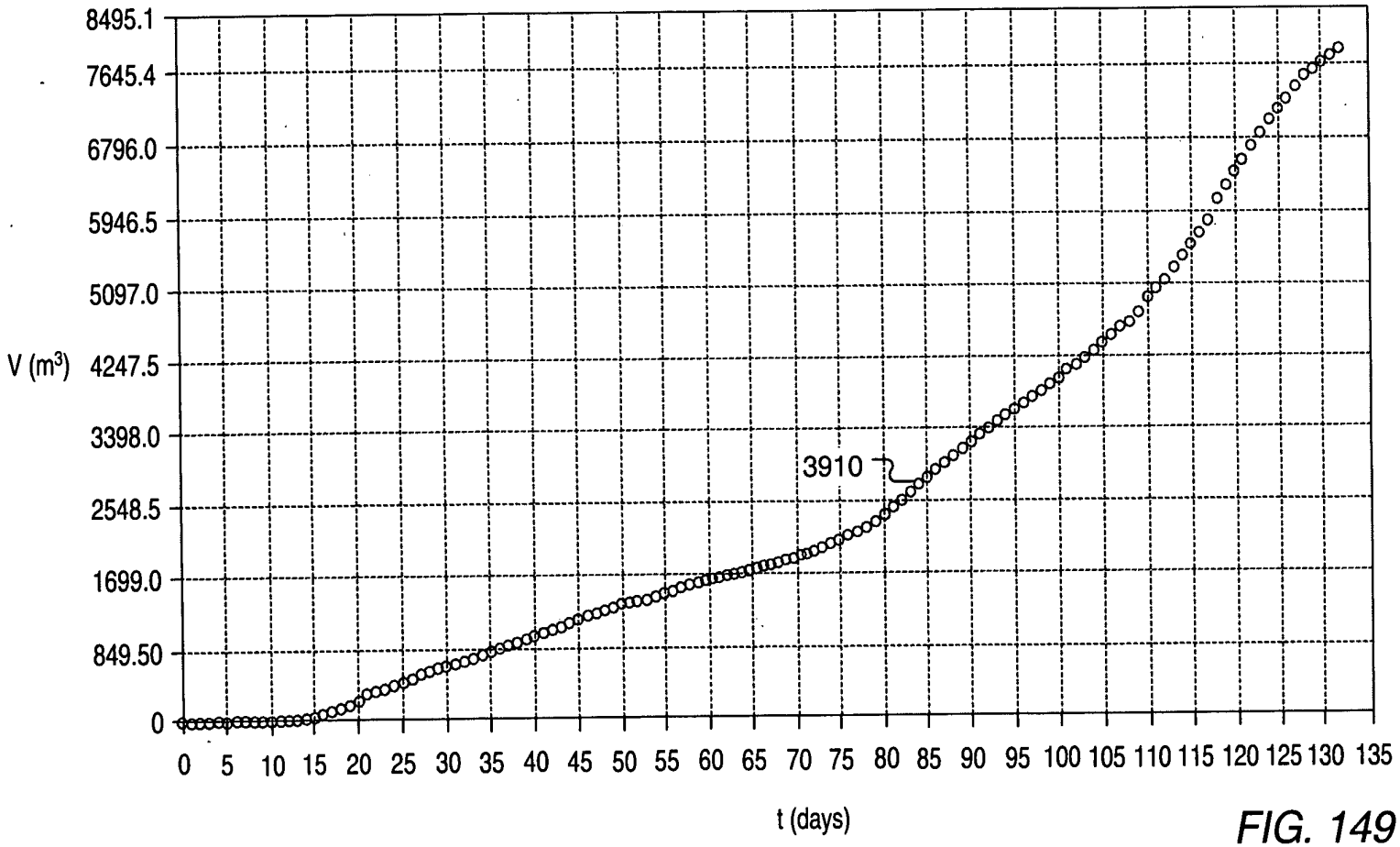

8495.1
7645.4
6796.0
5946.5
5097.0
V (m³) 4247.5
3398.0
2548.5
1699.0
849.50
0
3910
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135
t (days)

FIG. 149

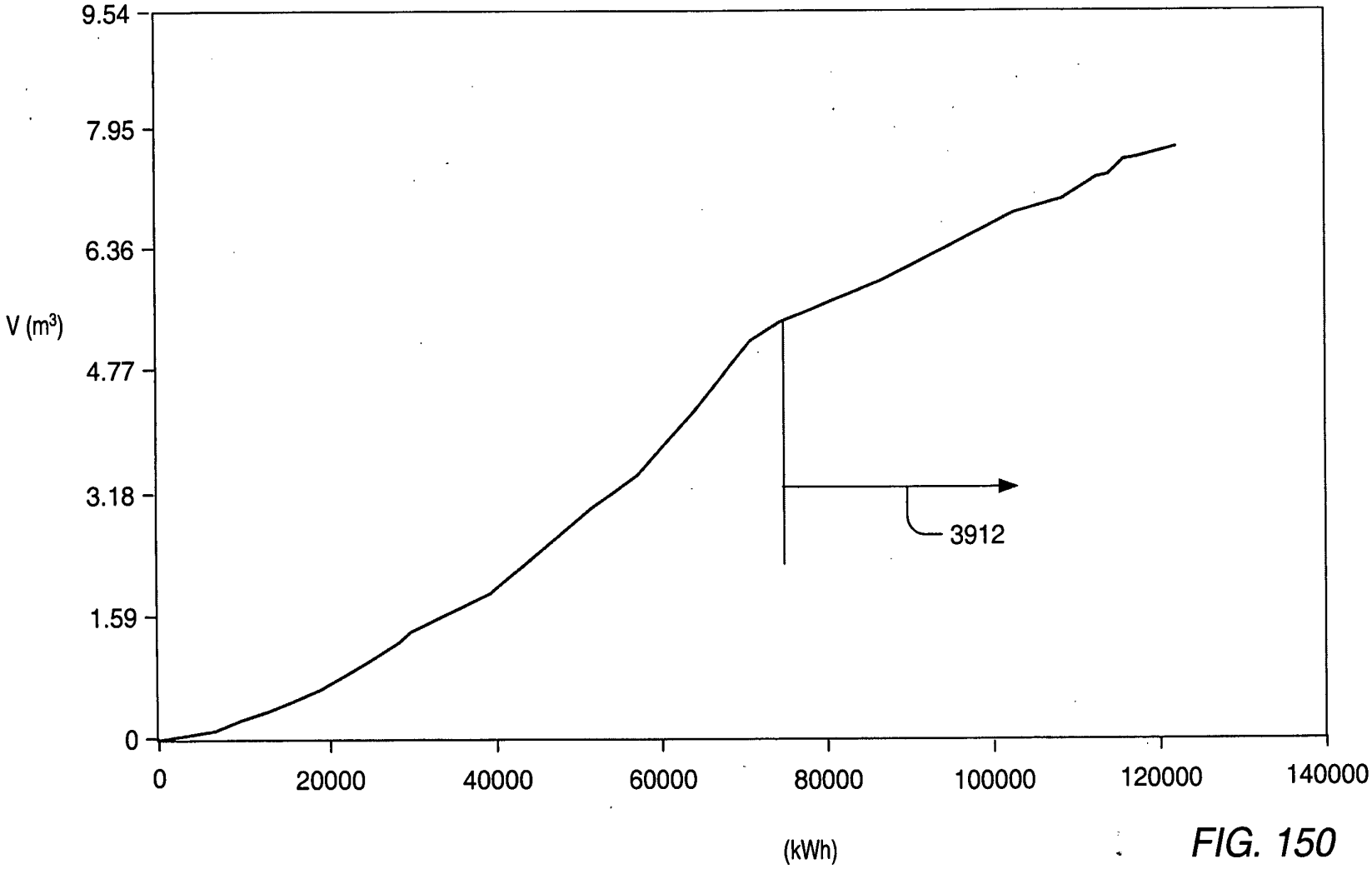

9.54
7.95
6.36
4.77
3.18
1.59
0
V (m³)
0
20000
40000
60000
80000
100000
120000
140000
(kWh)
3912

FIG. 150

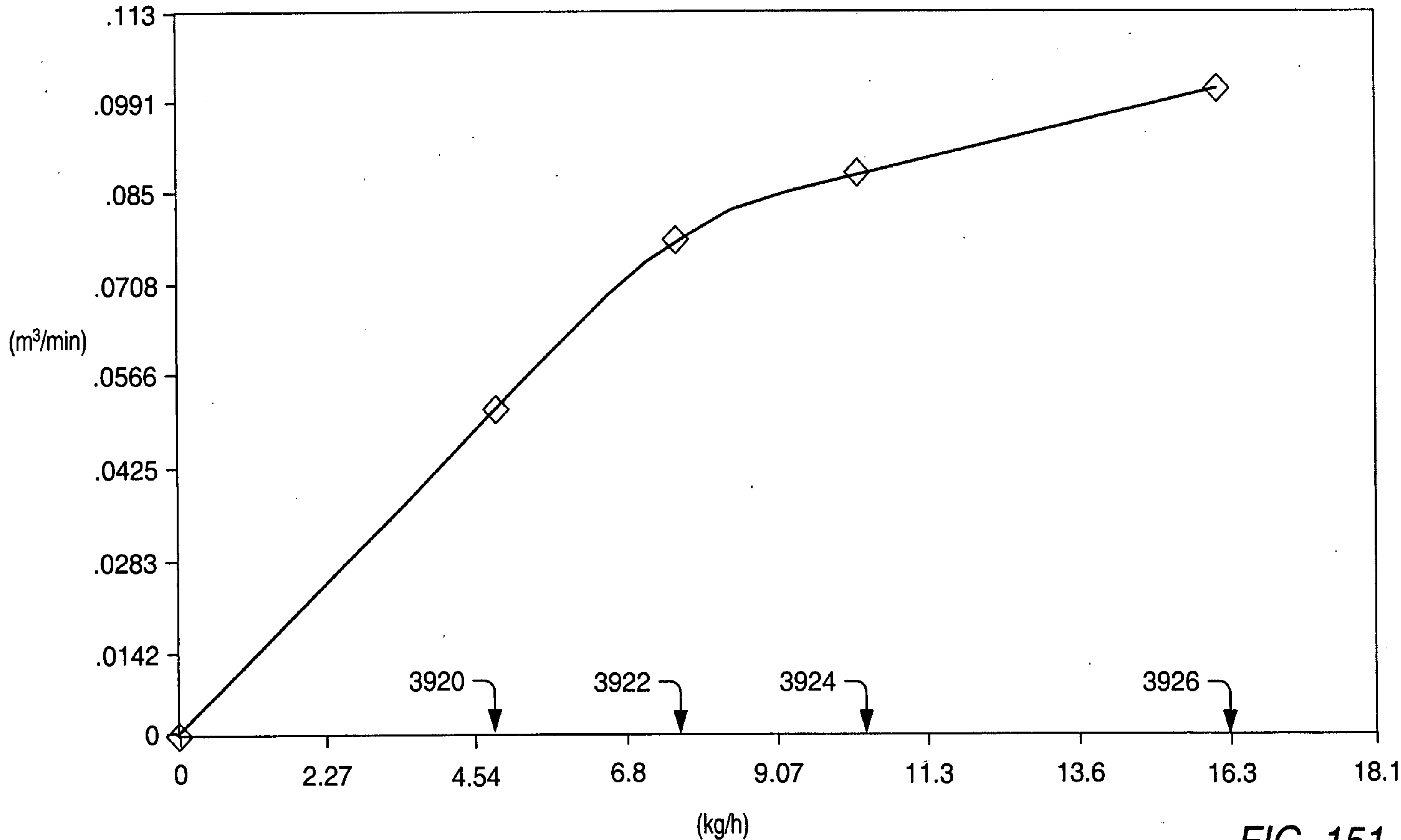


FIG. 151

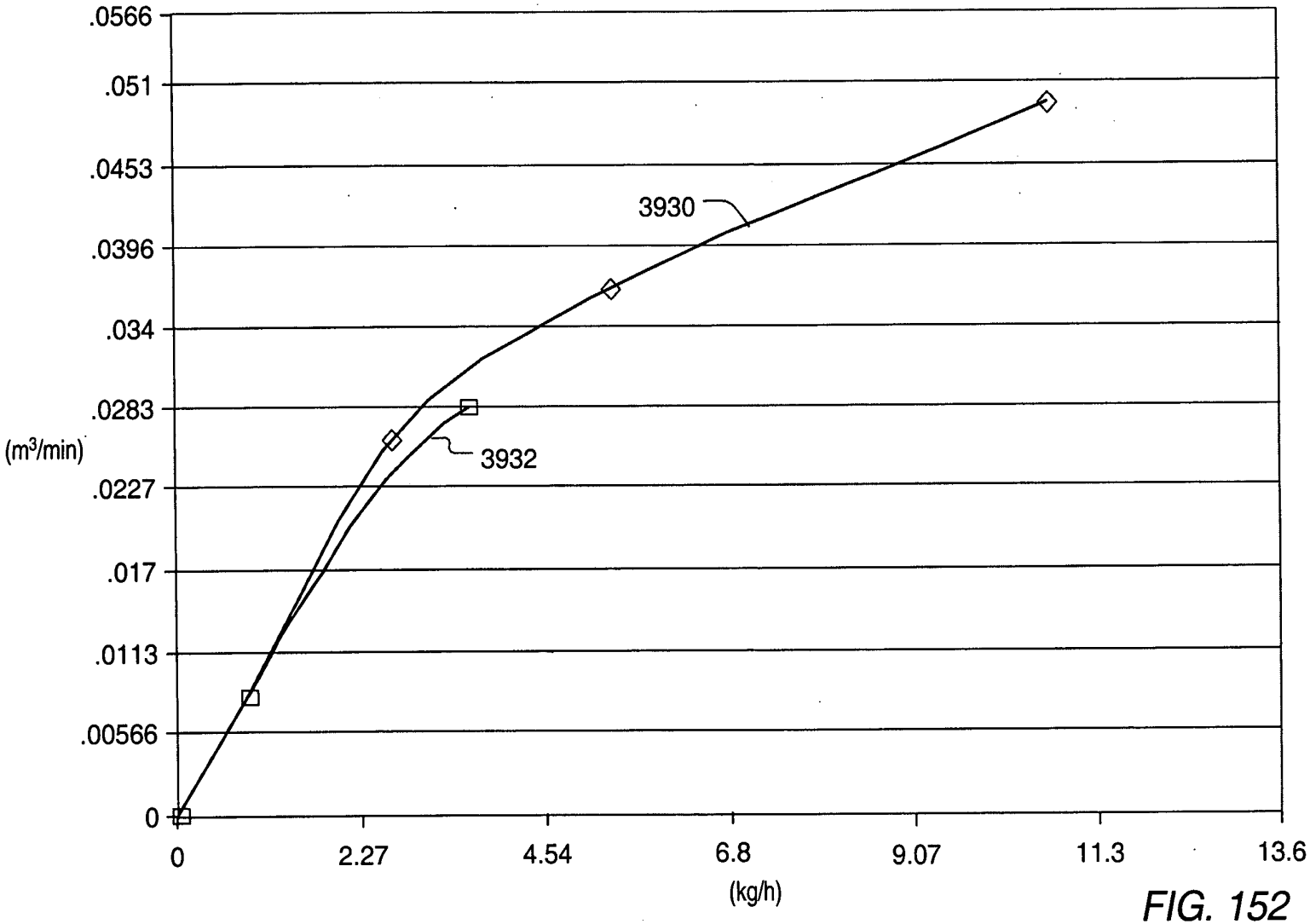

.0566
.051
.0453
.0396
.034
.0283
.0227
.017
.0113
.00566
0
(m3/min)
3930
3932
0
2.27
4.54
6.8
9.07
11.3
13.6
(kg/h)

FIG. 152

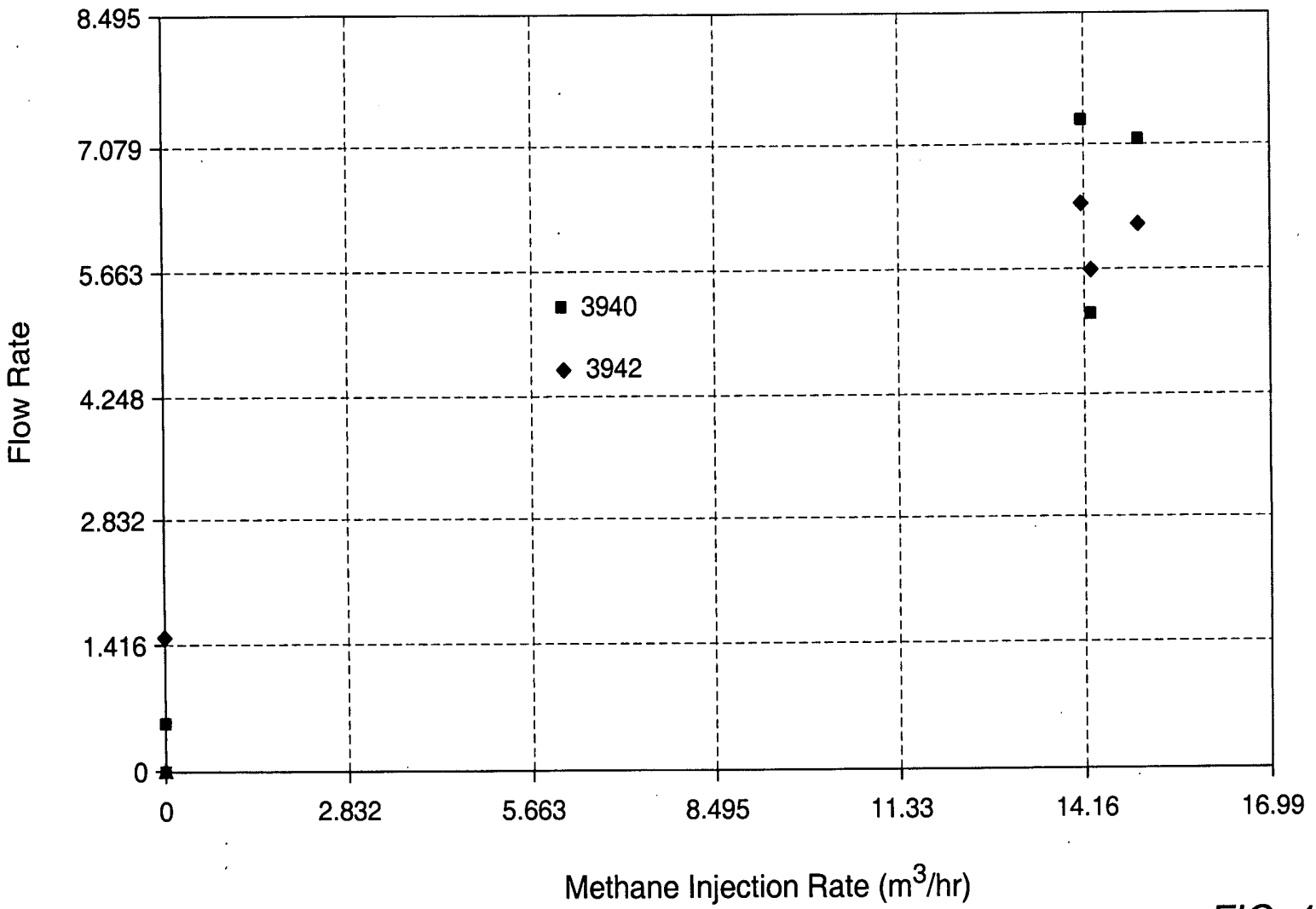

8.495
7.079
5.663
4.248
2.832
1.416
0
Flow Rate
3940
3942
0
2.832
5.663
8.495
11.33
14.16
16.99
Methane Injection Rate (m3/hr)

FIG. 153

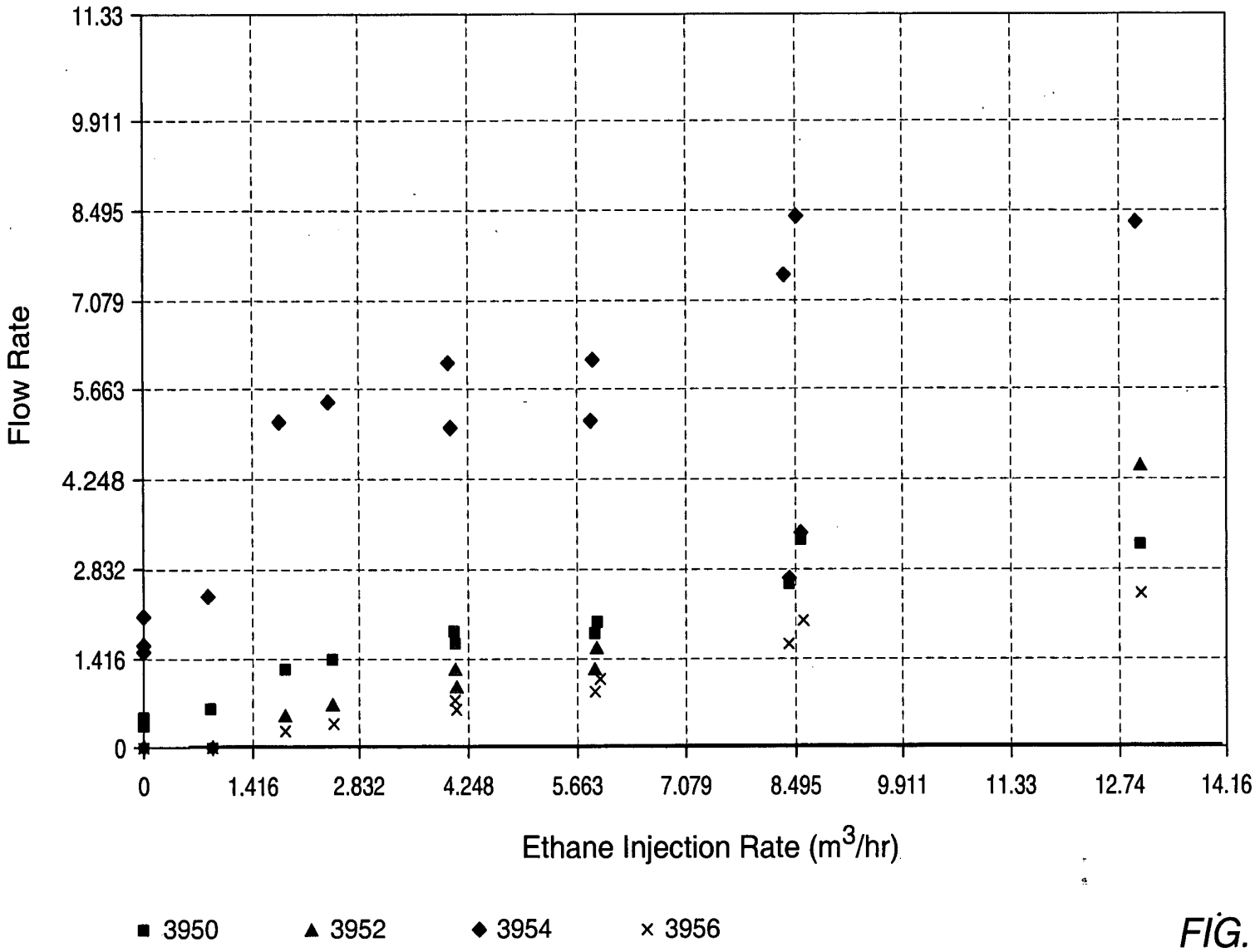

11.33
9.911
8.495
7.079
5.663
4.248
2.832
1.416
0
Flow Rate
0
1.416
2.832
4.248
5.663
7.079
8.495
9.911
11.33
12.74
14.16
Ethane Injection Rate (m3/hr)
3950
3952
3954
3956

FIG. 154

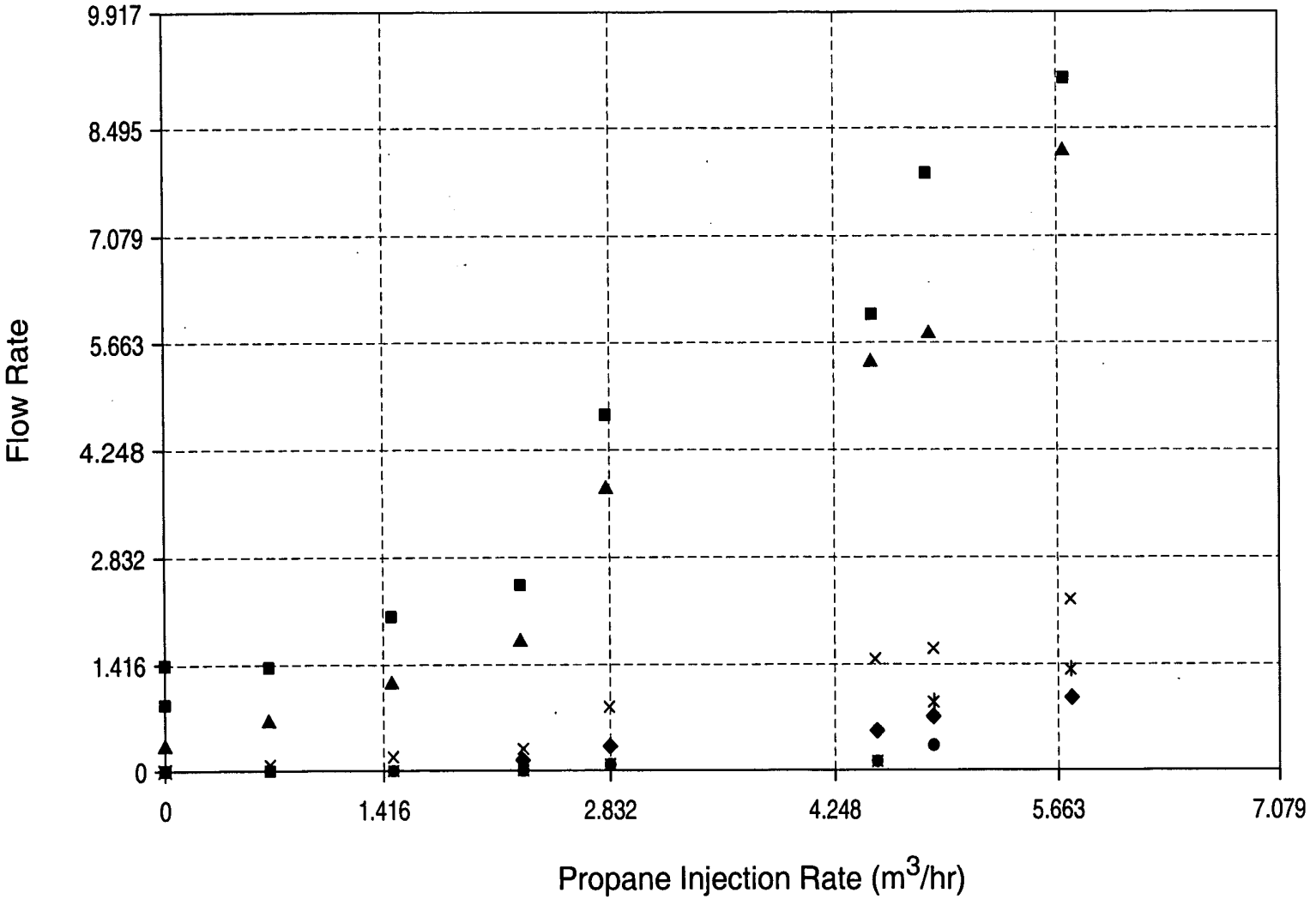

9.917
8.495
7.079
5.663
4.248
2.832
1.416
0
Flow Rate
0
1.416
2.832
4.248
5.663
7.079
Propane Injection Rate (m3/hr)
3960
3962
3964
3966
3968
3969

FIG. 155

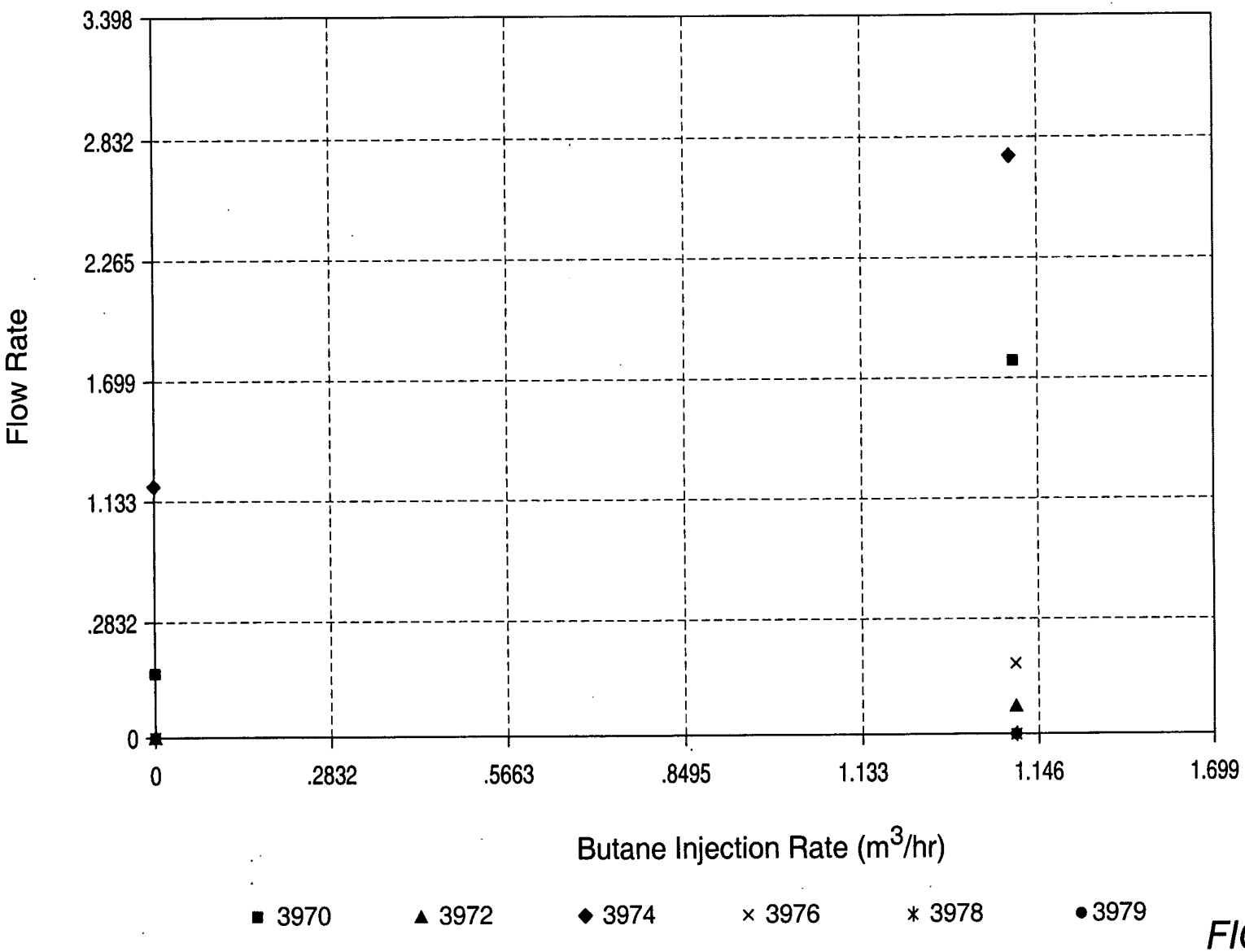

3.398
2.832
2.265
1.699
1.133
.2832
0
Flow Rate
0
.2832
.5663
.8495
1.133
1.146
1.699
Butane Injection Rate (m3/hr)
3970
3972
3974
3976
3978
3979

FIG. 156

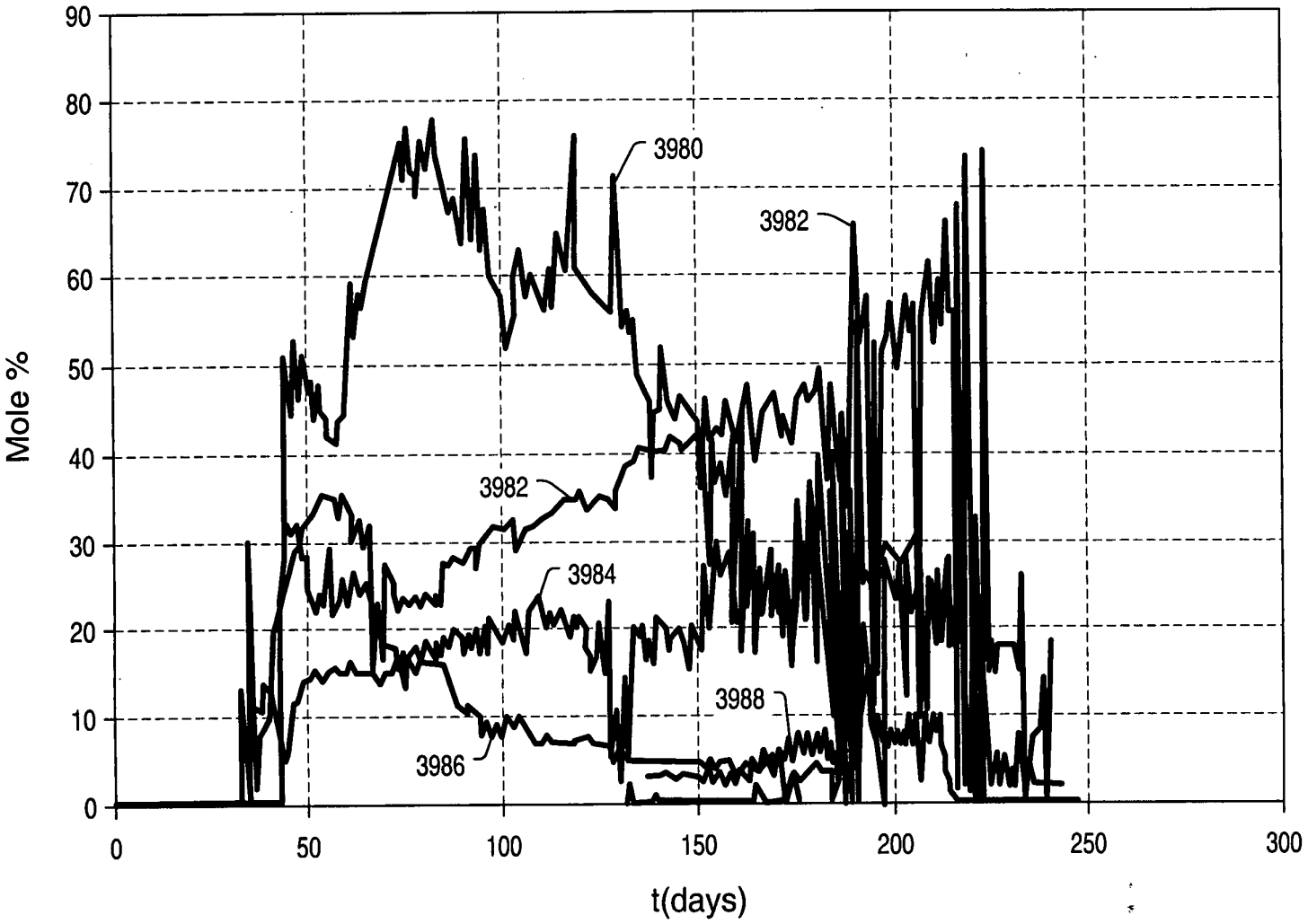

90
80
70
60
50
40
30
20
10
0
Mole %
0
50
100
150
200
250
300
t(days)
3980
3982
3982
3984
3988
3986

FIG. 157

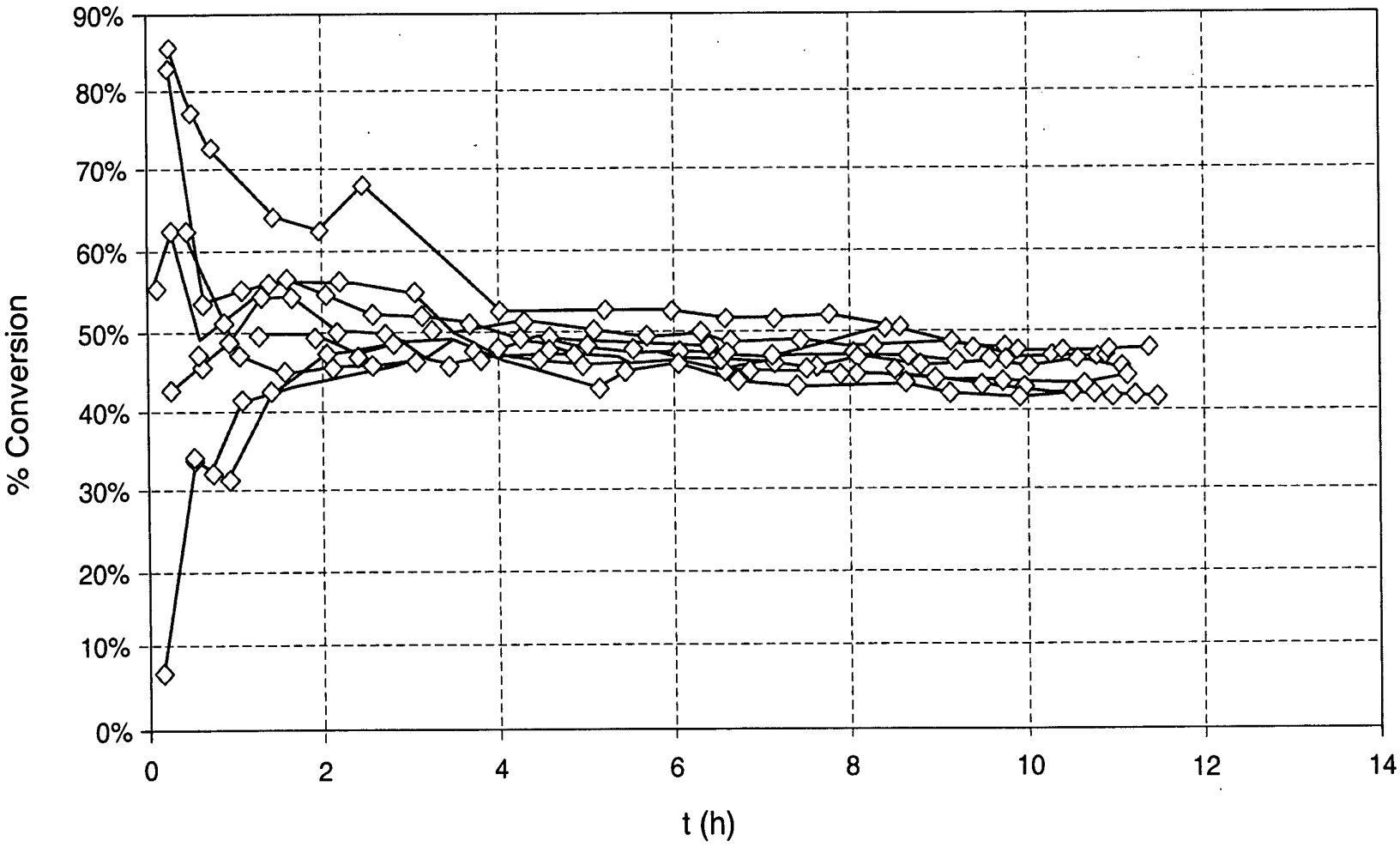


FIG. 158

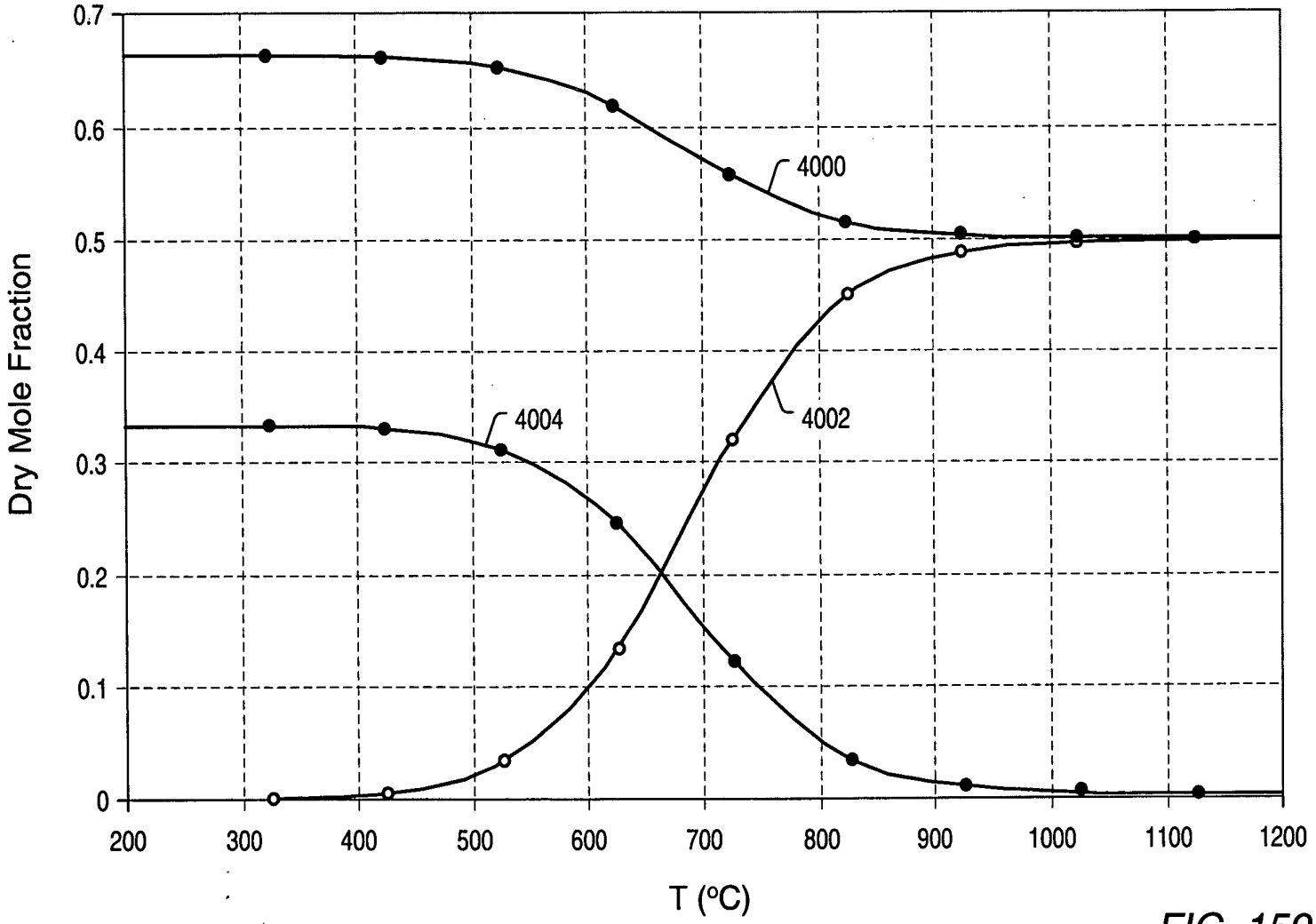

0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Dry Mole Fraction
200
300
400
500
600
700
800
900
1000
1100
1200
T (°C)
4000
4002
4004

FIG. 159

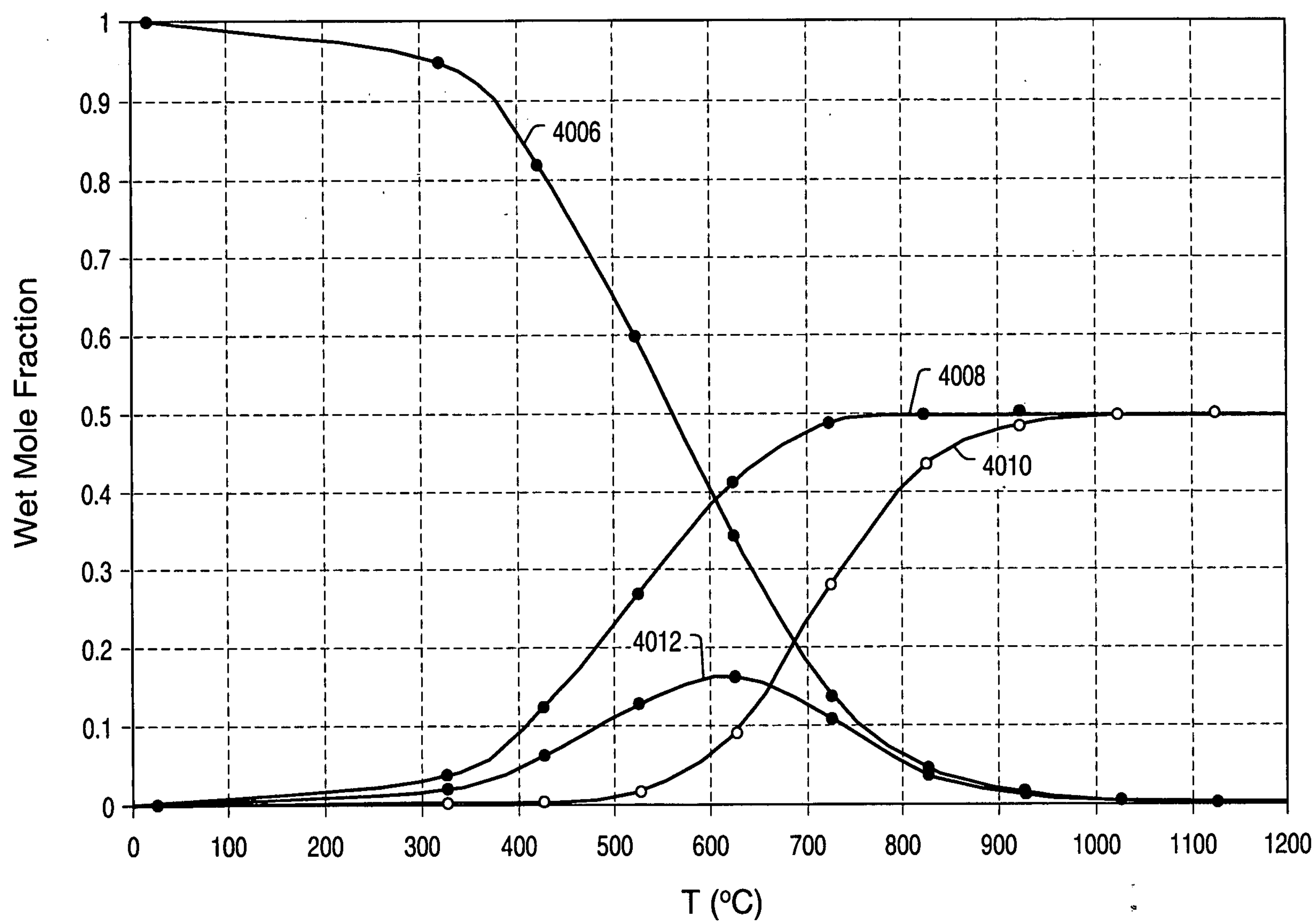

Wet Mole Fraction
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
T (°C)
4006
4008
4010
4012

FIG. 160

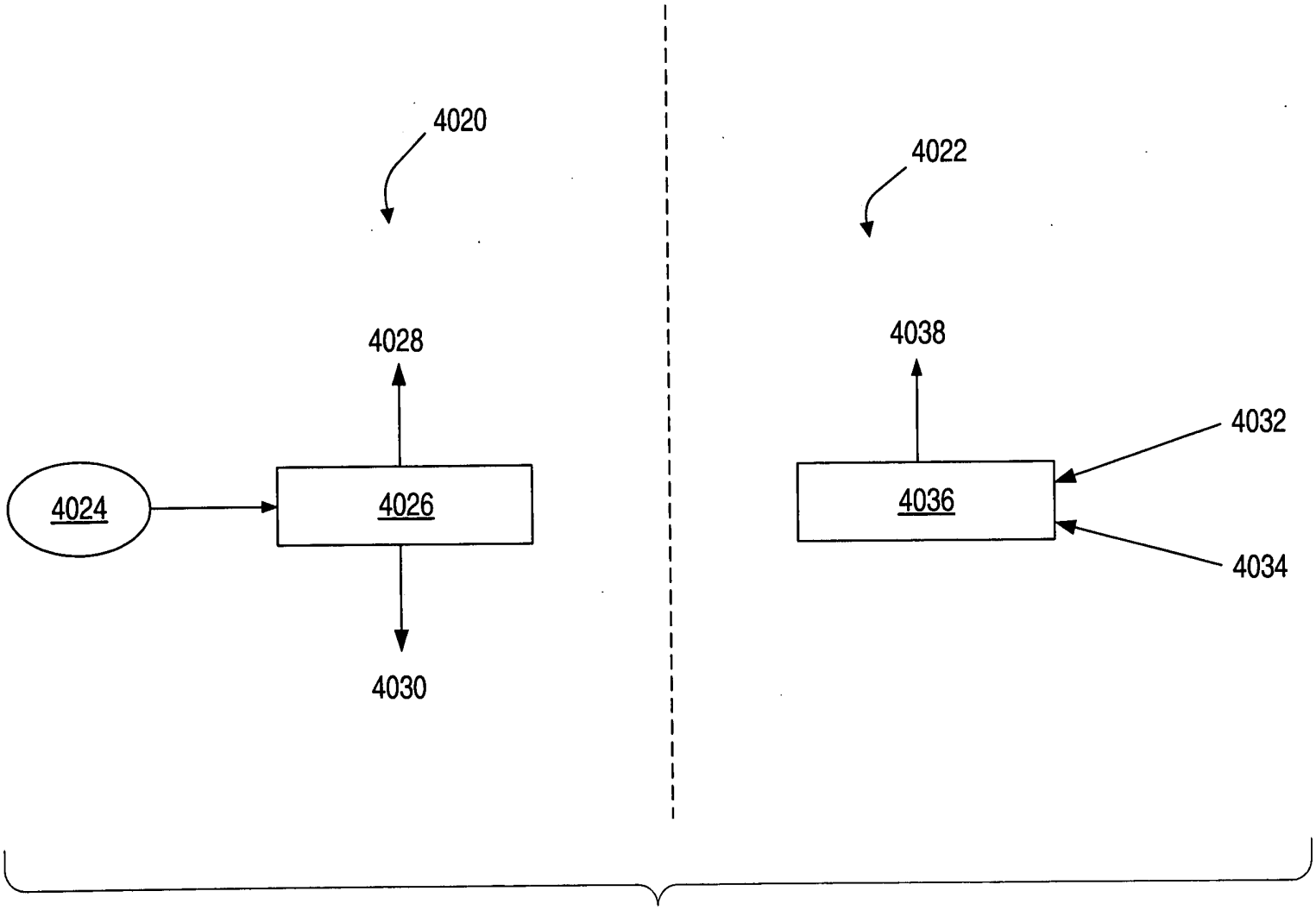


FIG. 161

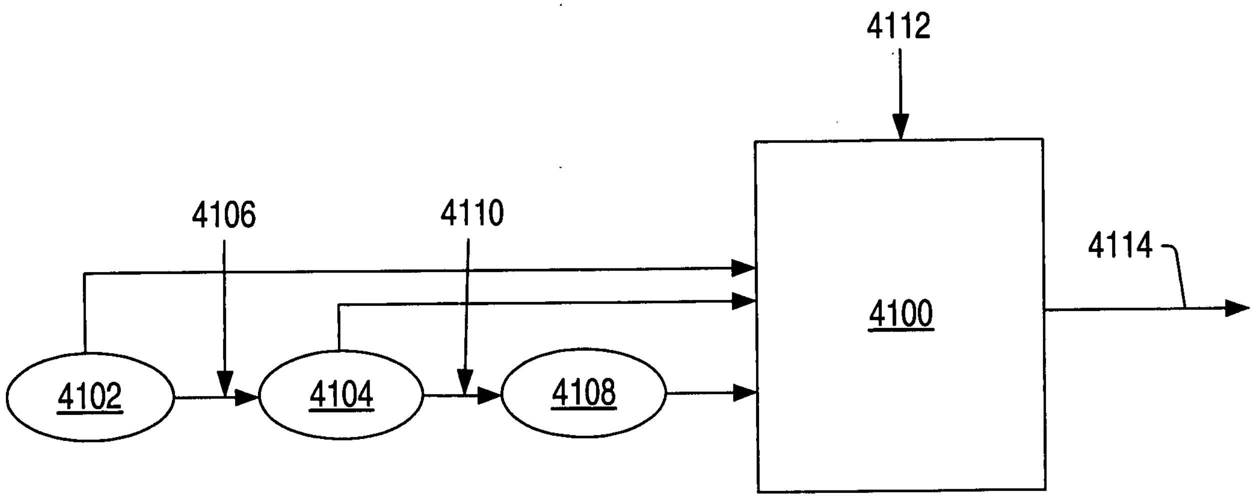


FIG. 162

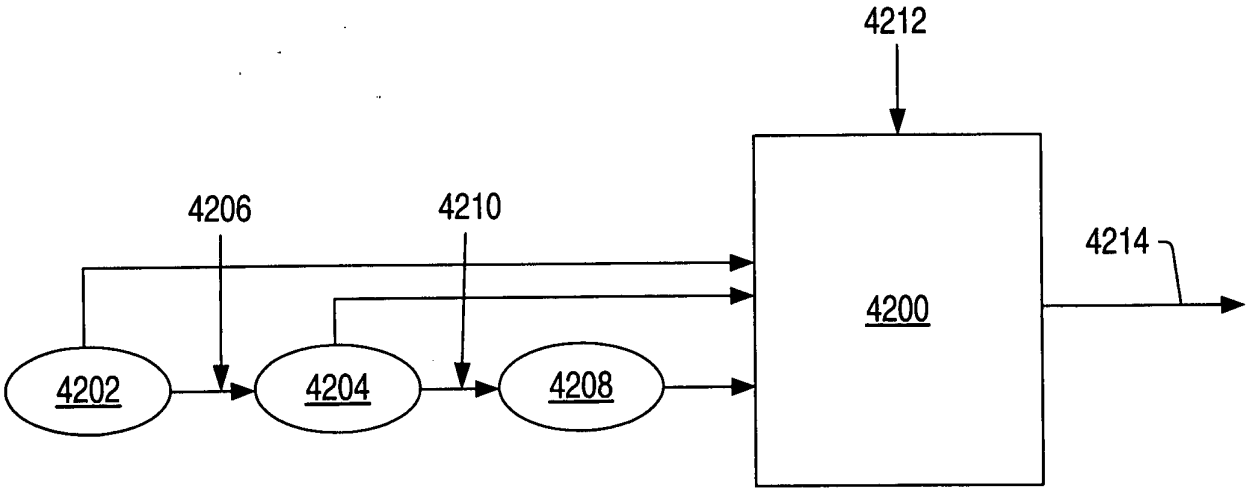


FIG. 163

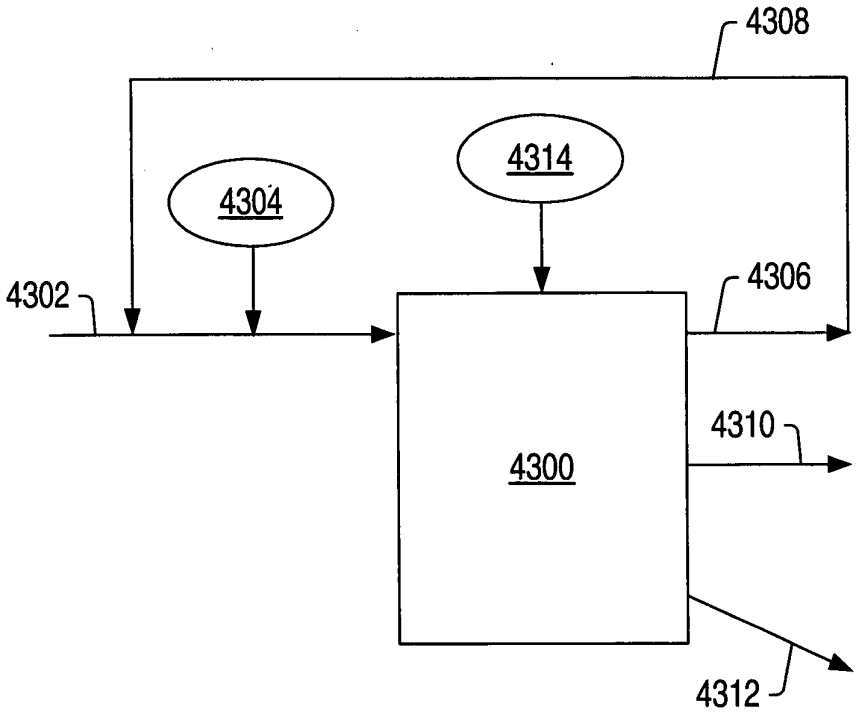


FIG. 164

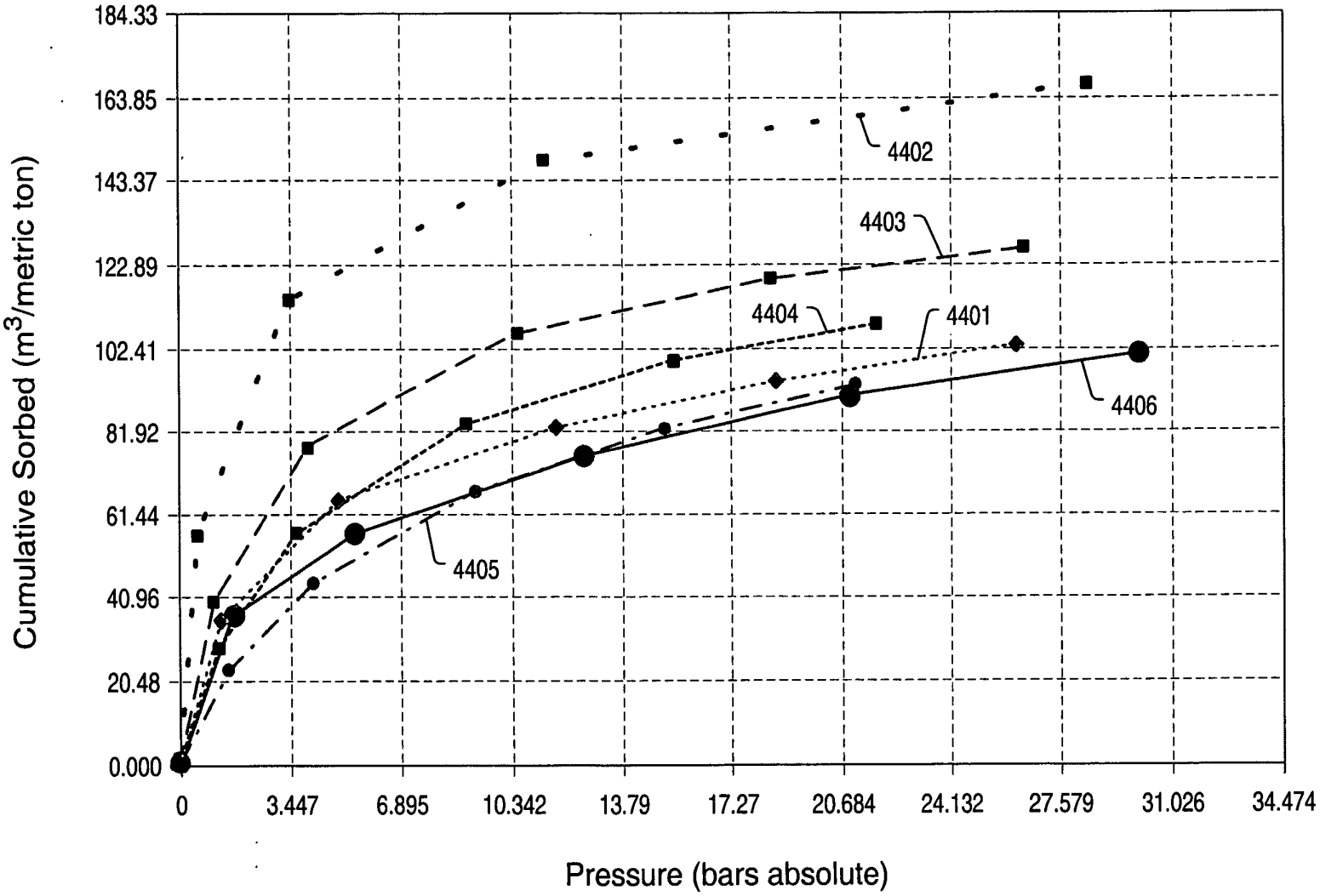

184.33
163.85
143.37
122.89
102.41
81.92
61.44
40.96
20.48
0.000
Cumulative Sorbed (m3/metric ton)
0
3.447
6.895
10.342
13.79
17.27
20.684
24.132
27.579
31.026
34.474
Pressure (bars absolute)
4402
4403
4404
4401
4406
4405

FIG. 165

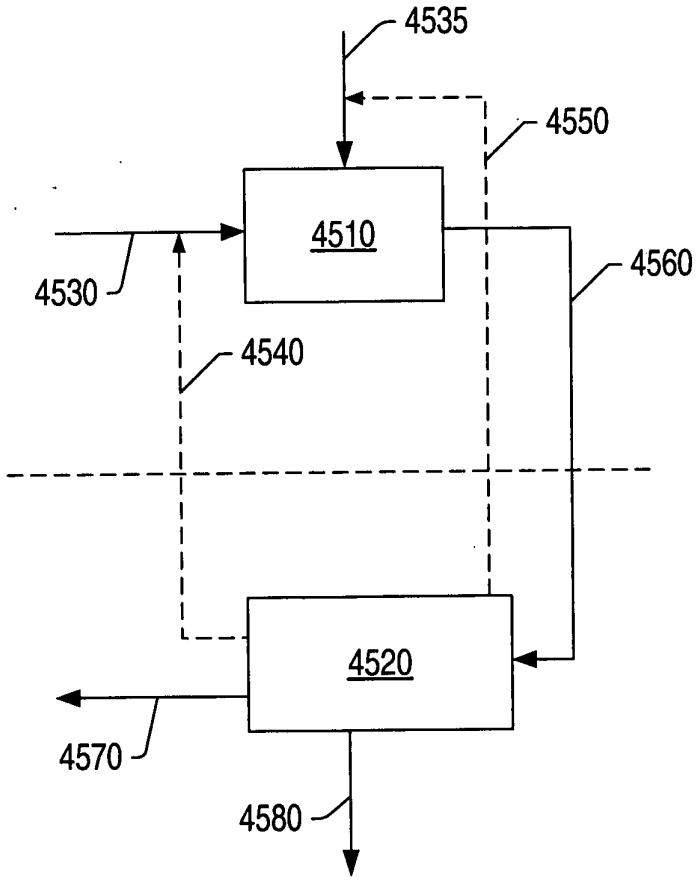


FIG. 166

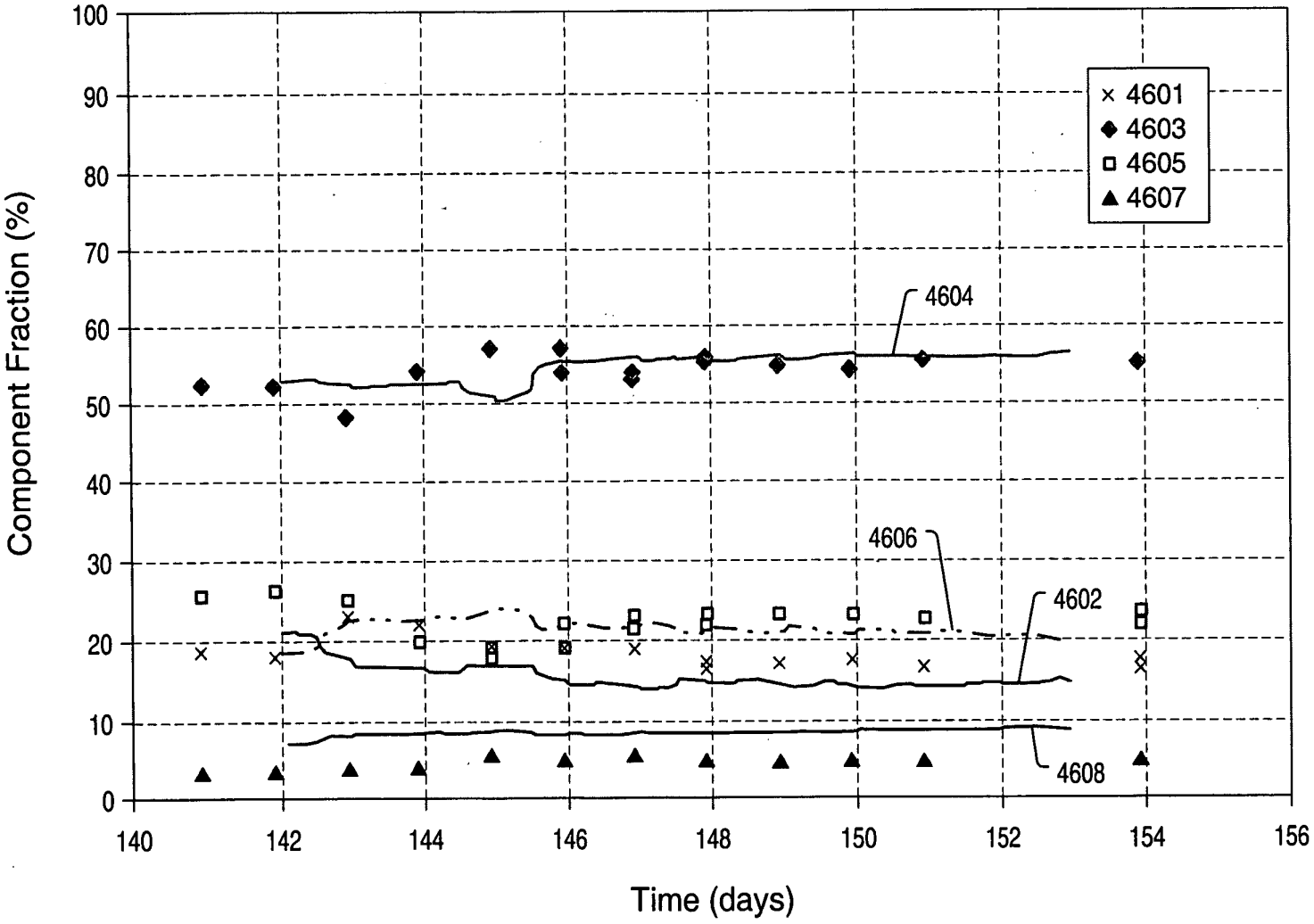


FIG. 167

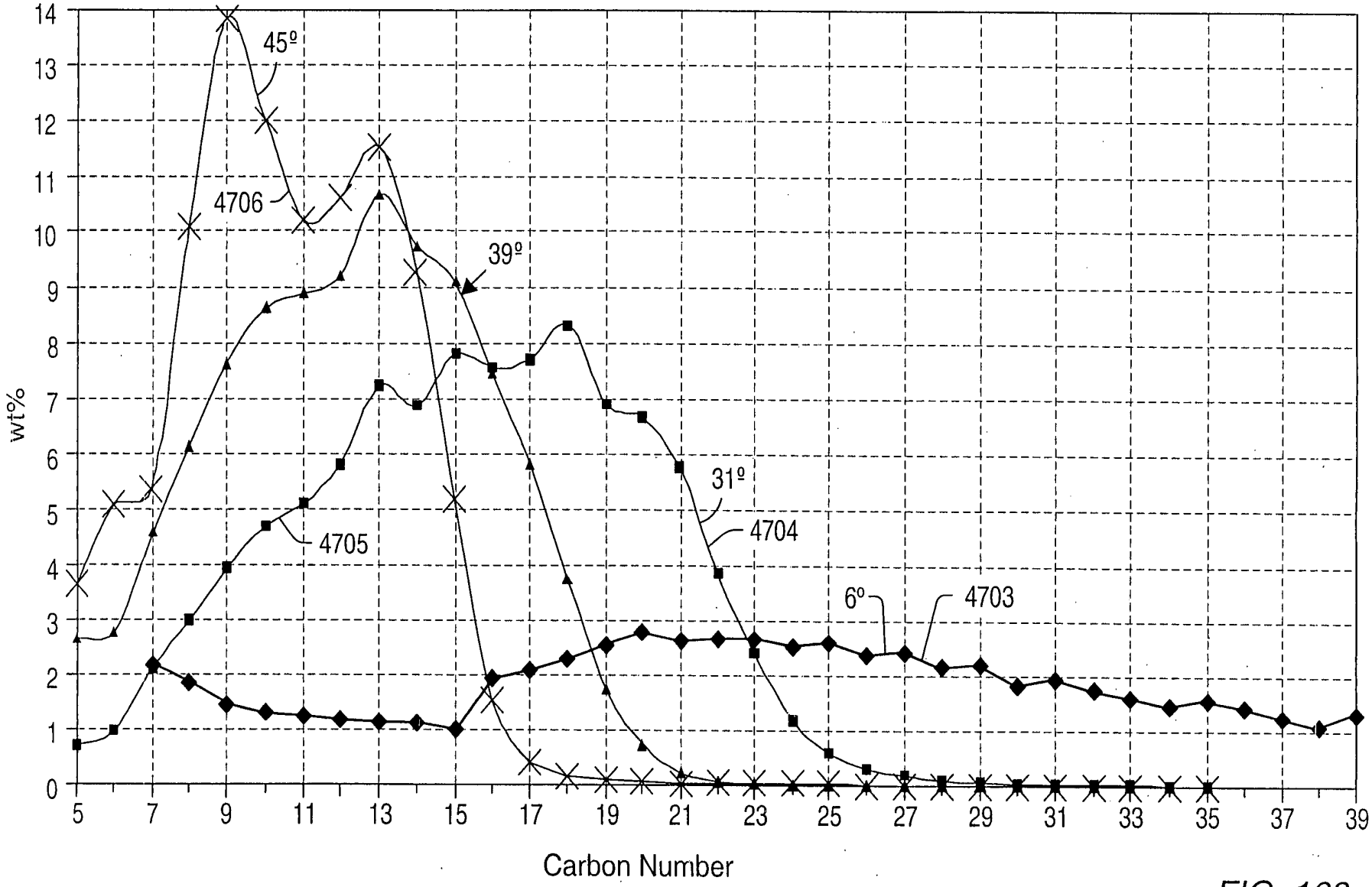

45º
4706
39º
31º
4704
4705
6º
4703
wt%
Carbon Number
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39

FIG. 168

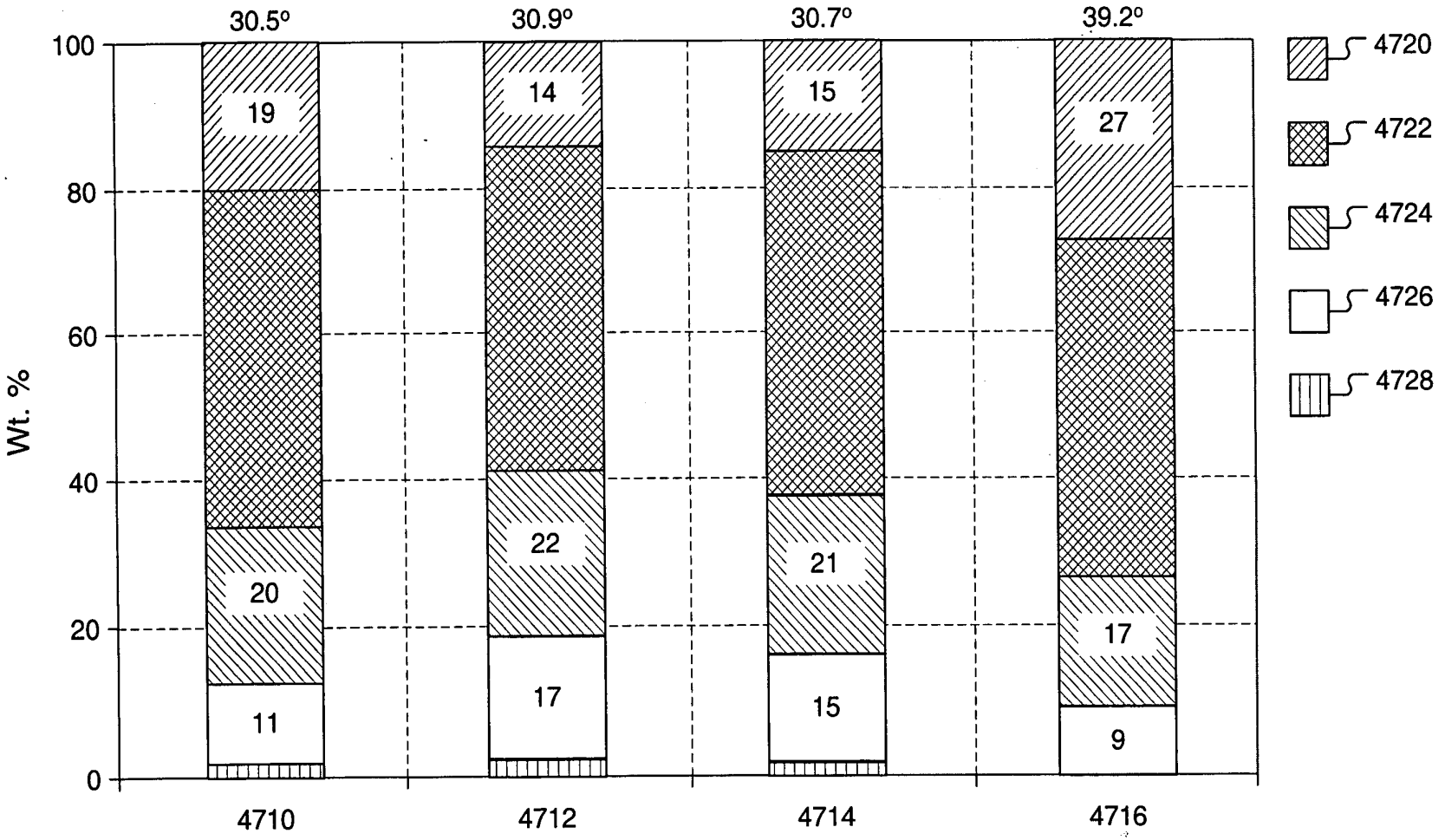

30.5°
30.9°
30.7°
39.2°
100
80
60
40
20
0
Wt. %
19
20
11
14
22
17
15
21
15
27
17
9
4710
4712
4714
4716
4720
4722
4724
4726
4728

FIG. 169

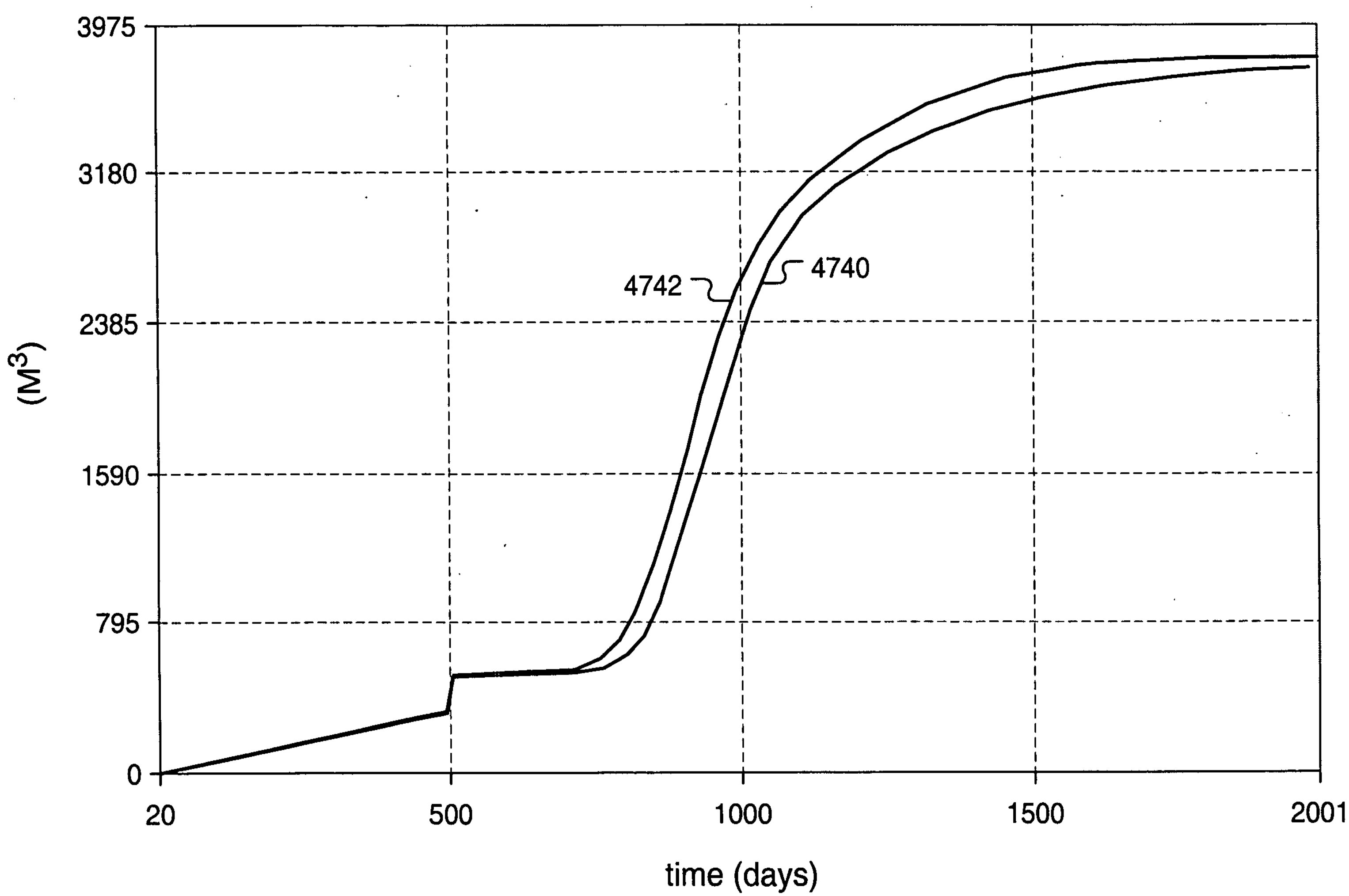

(M3)
3975
3180
2385
1590
795
0
20
500
1000
1500
2001
time (days)
4742
4740

FIG. 170

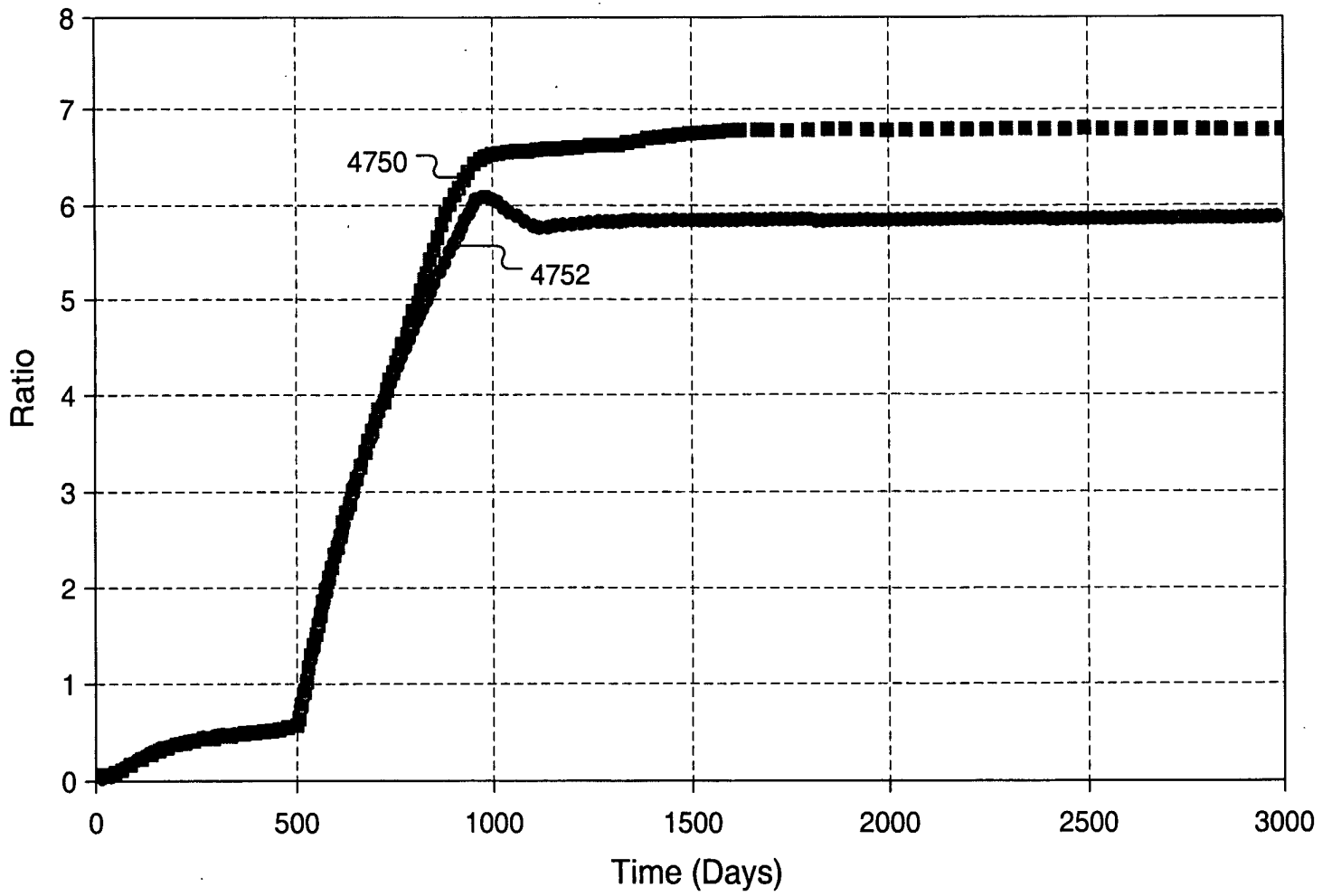

8
7
6
5
4
3
2
1
0
Ratio
4750
4752
0
500
1000
1500
2000
2500
3000
Time (Days)

FIG. 171

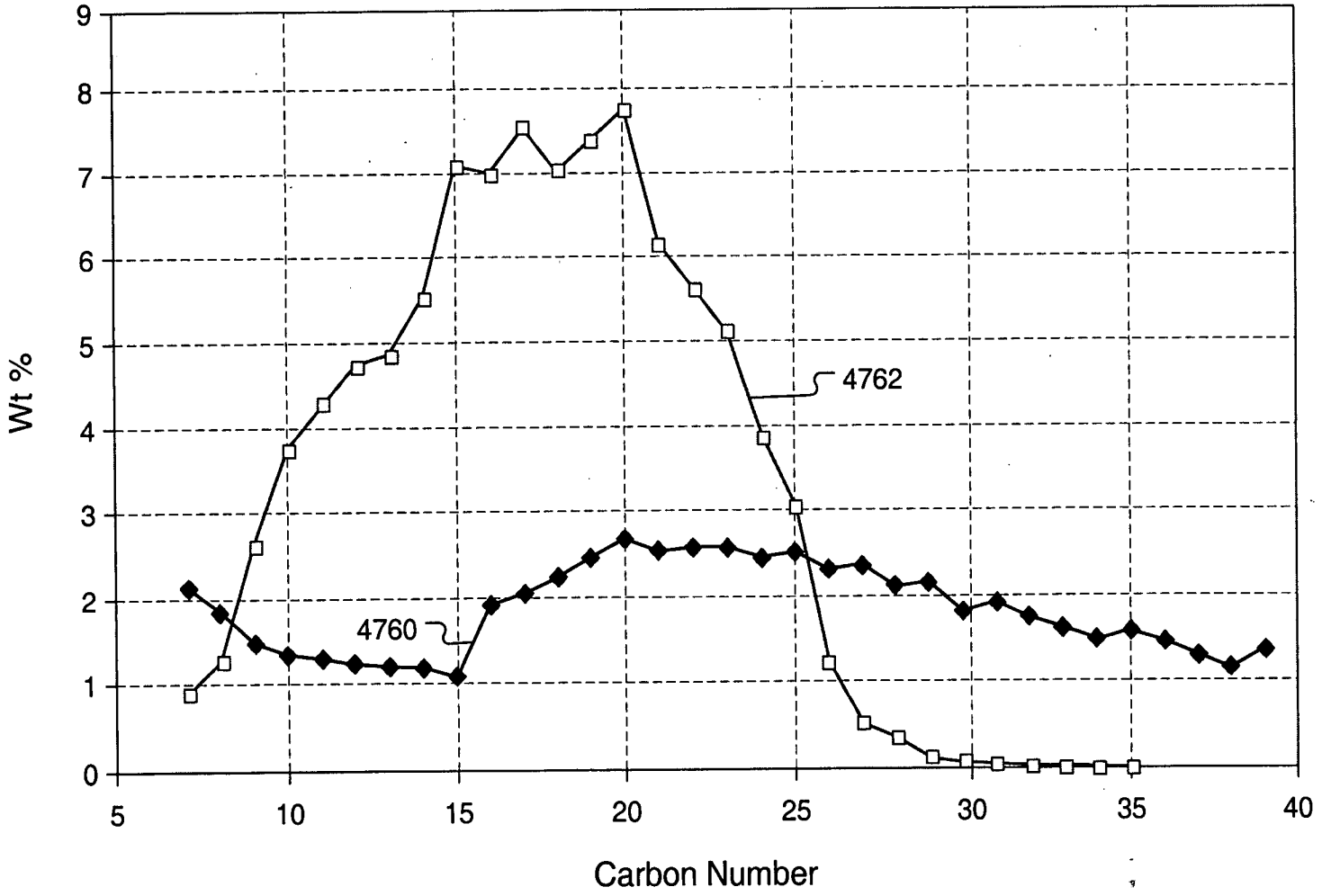


FIG. 172

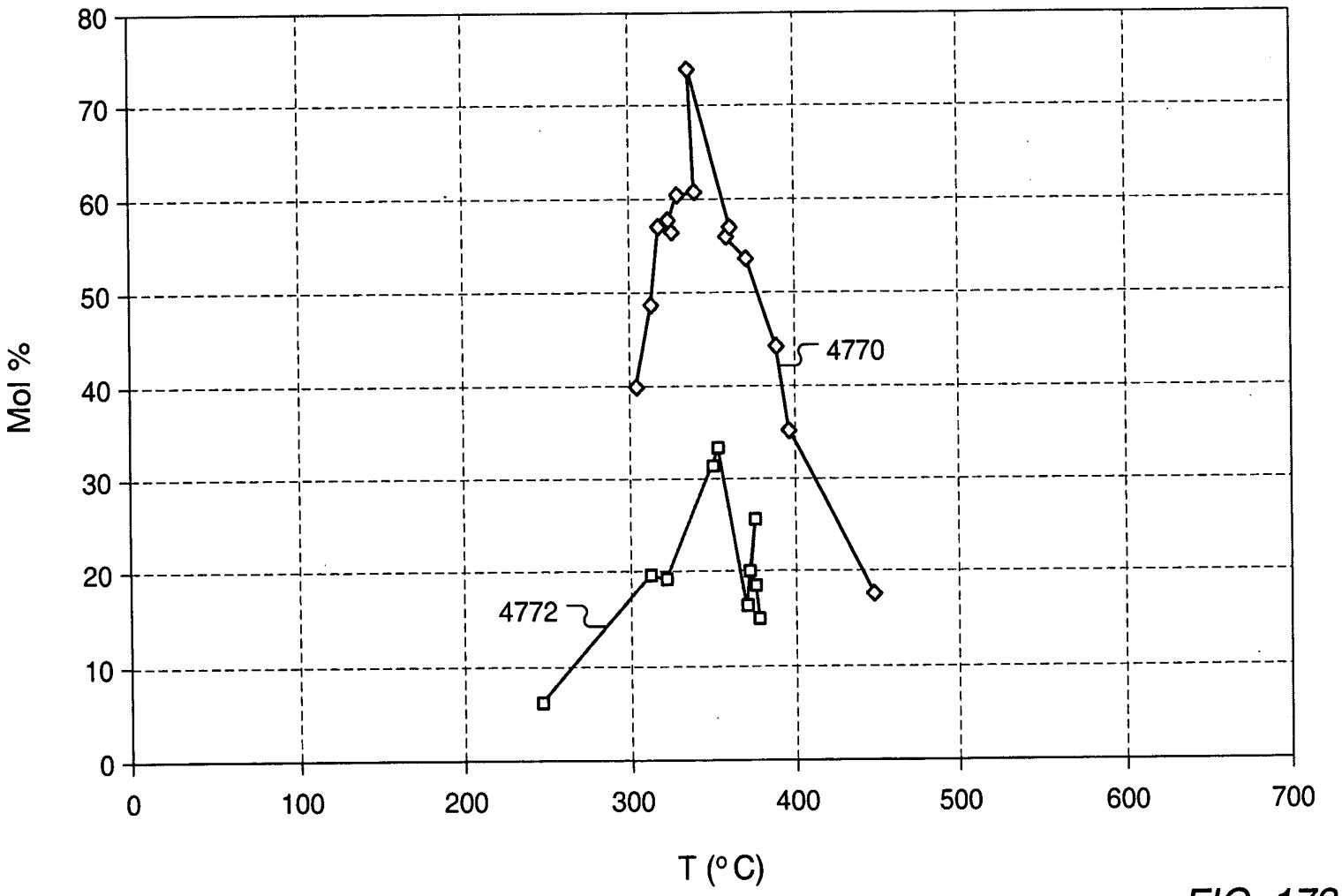


FIG. 173

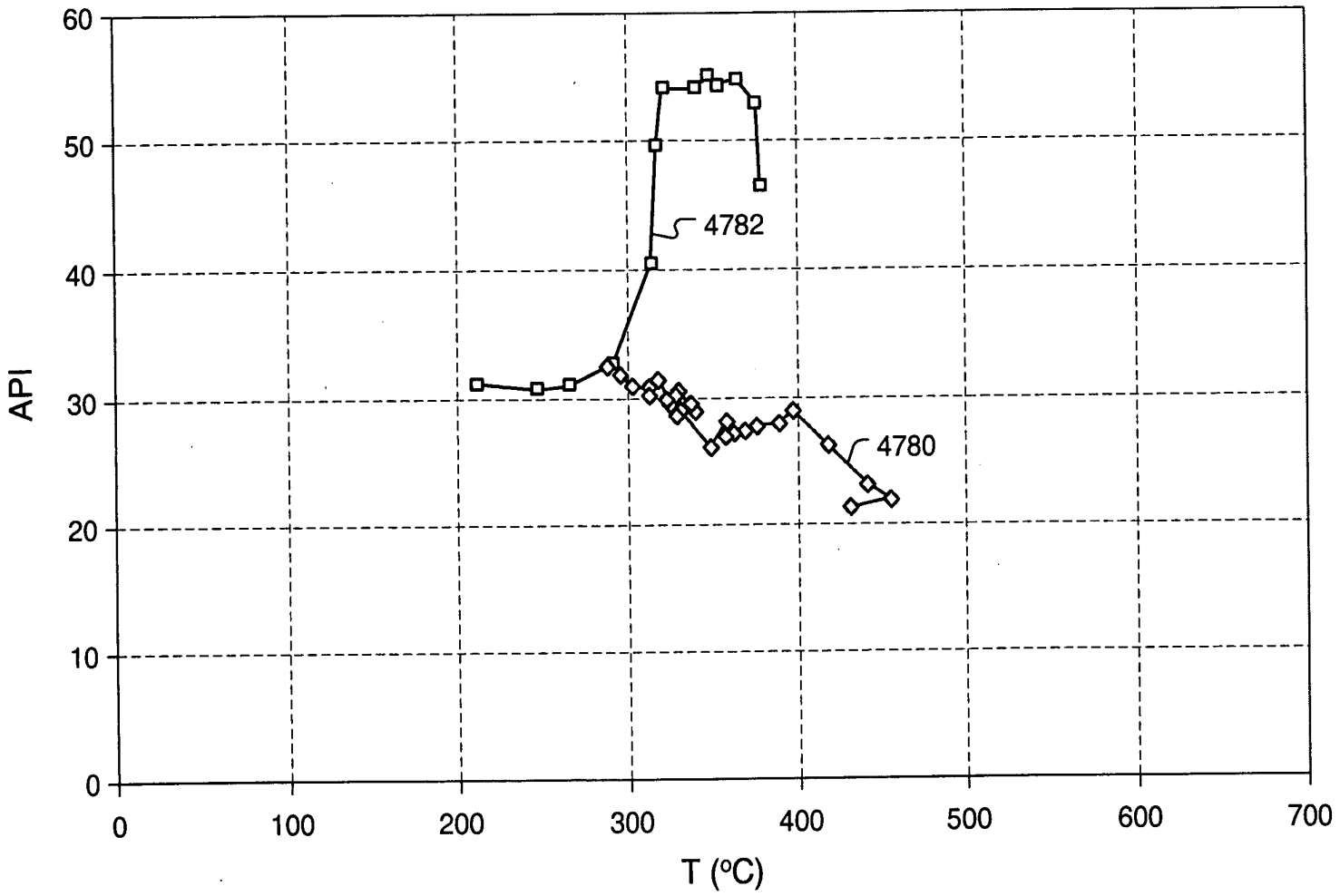


FIG. 174

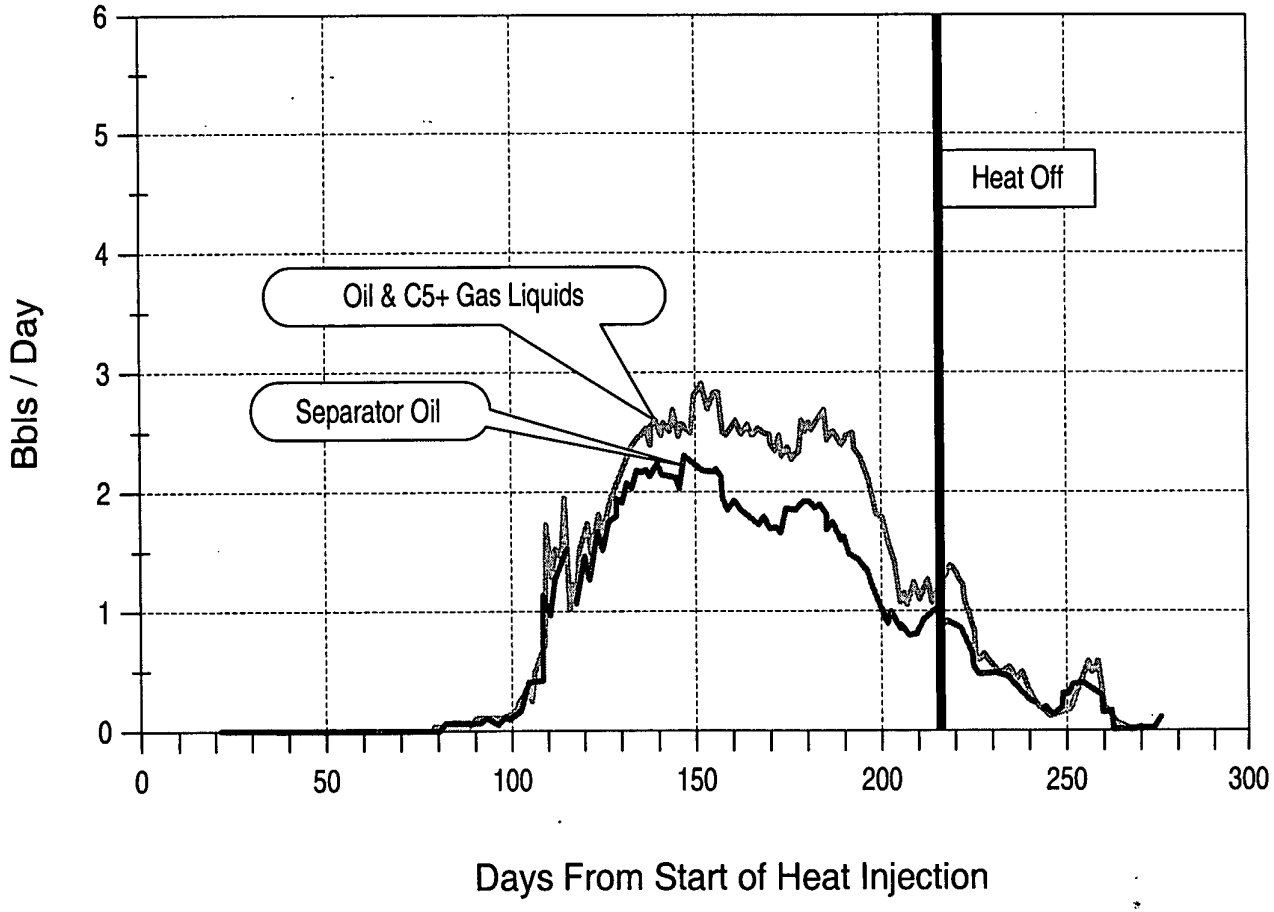


FIG. 175

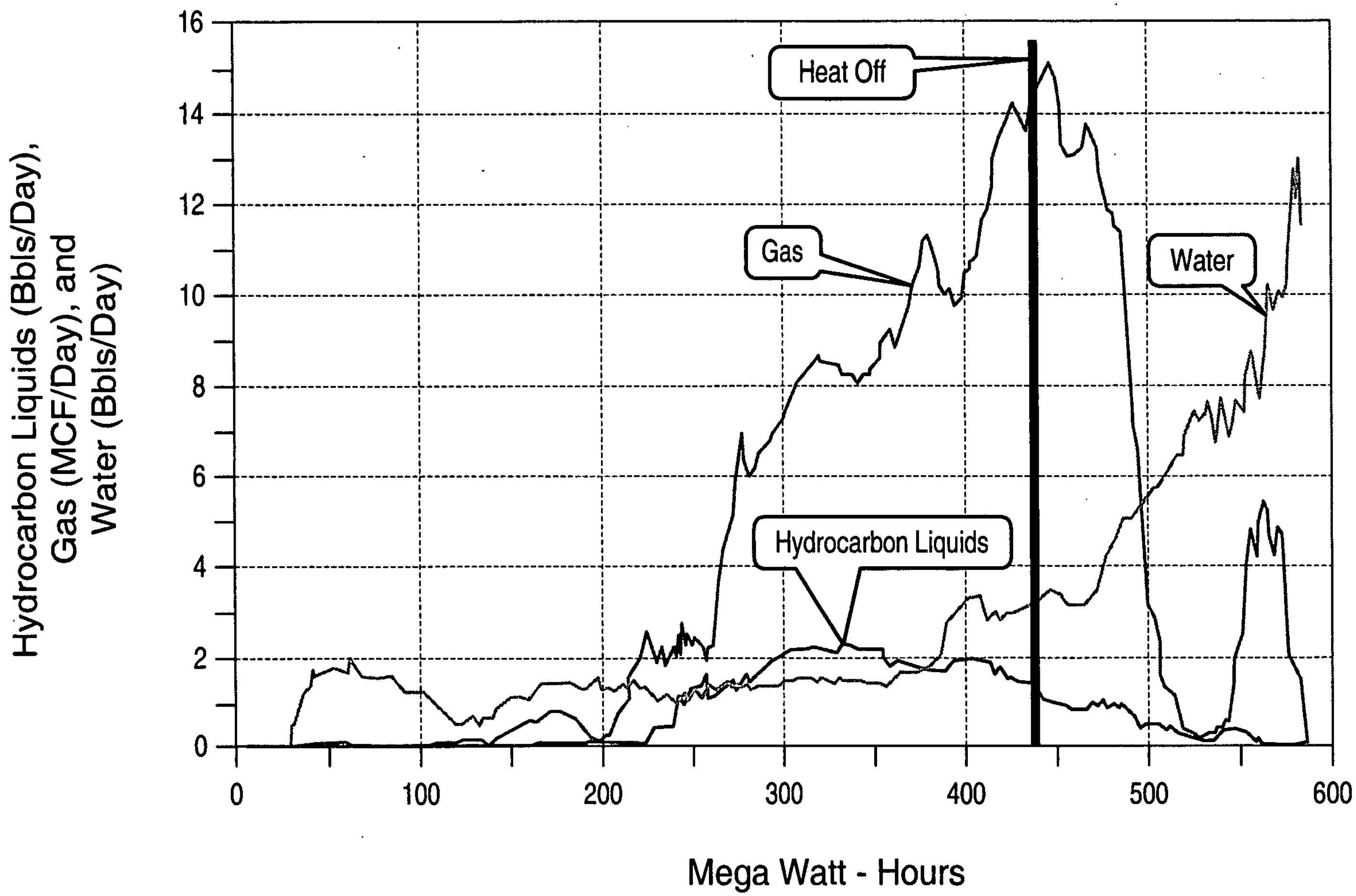

Hydrocarbon Liquids (Bbls/Day), Gas (MCF/Day), and Water (Bbls/Day)
16
14
12
10
8
6
4
2
0
0
100
200
300
400
500
600
Mega Watt - Hours
Heat Off
Gas
Water
Hydrocarbon Liquids

FIG. 176

Pressure (bars absolute)
172.37
137.90
103.42
68.95
34.47
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
time(days)

FIG. 177

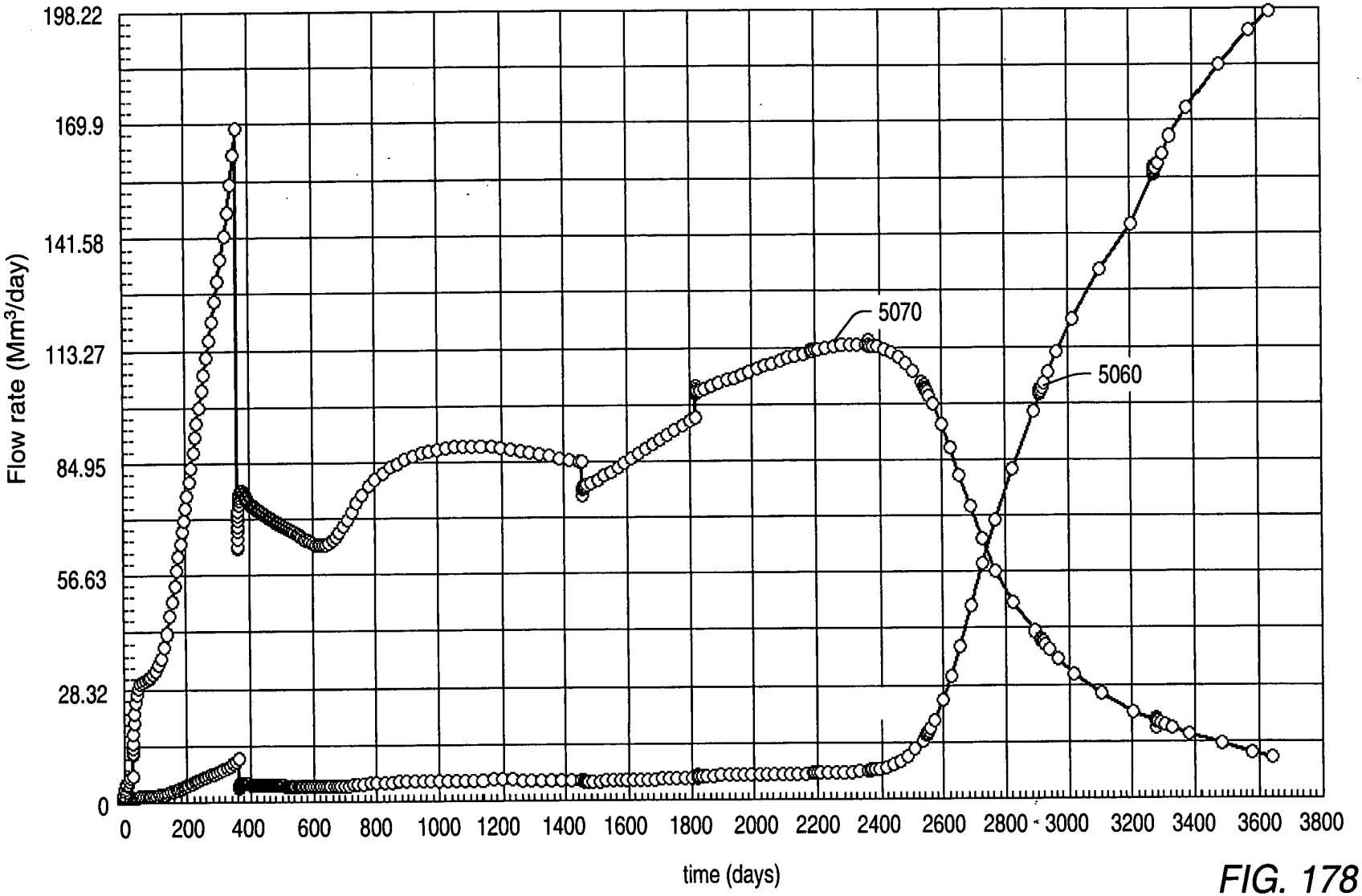

198.22
169.9
141.58
113.27
84.95
56.63
28.32
0
Flow rate (Mm³/day)
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
time (days)
5070
5060

FIG. 178

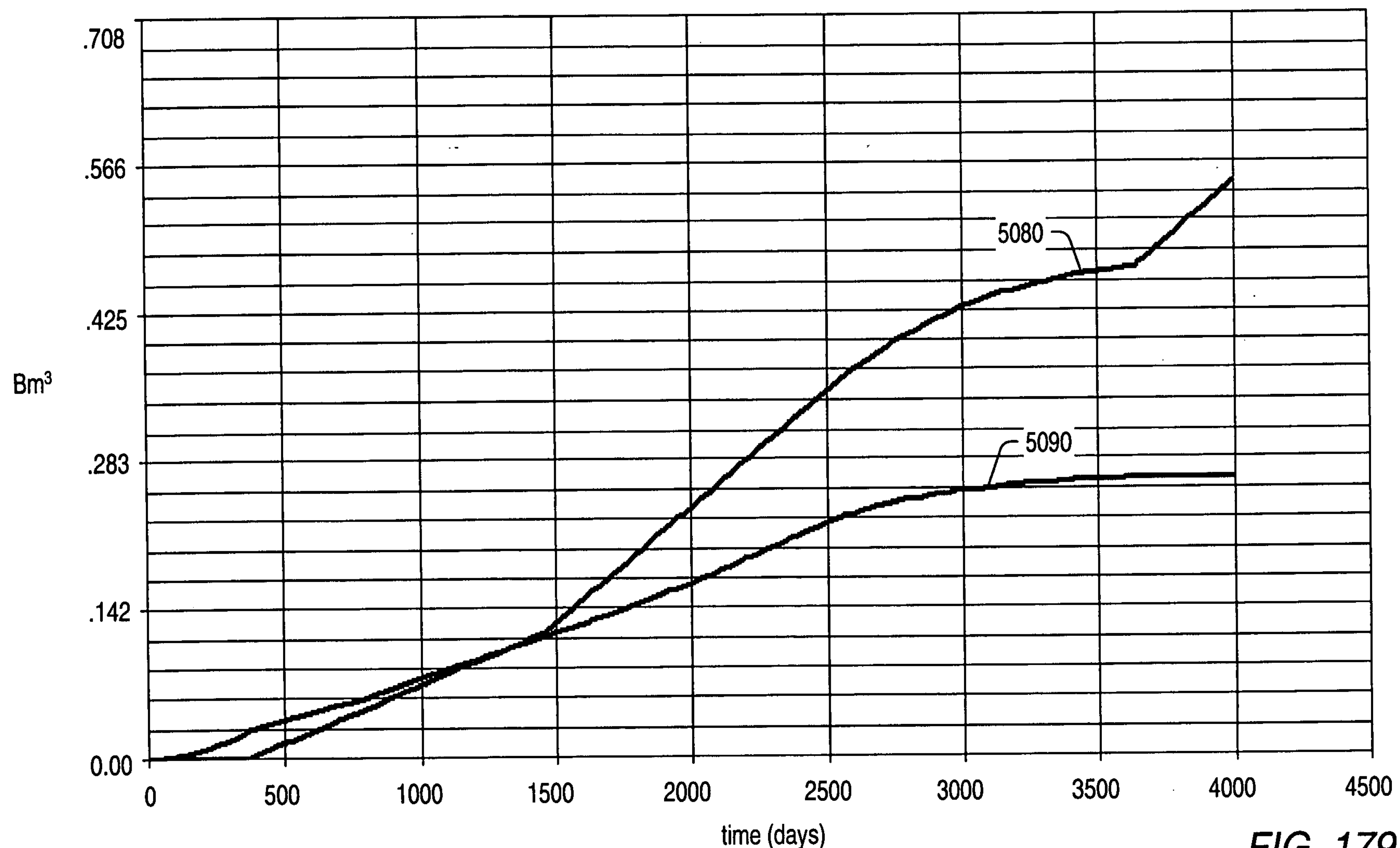

.708
.566
.425
.283
.142
0.00
Bm3
0
500
1000
1500
2000
2500
3000
3500
4000
4500
time (days)
5080
5090

FIG. 179

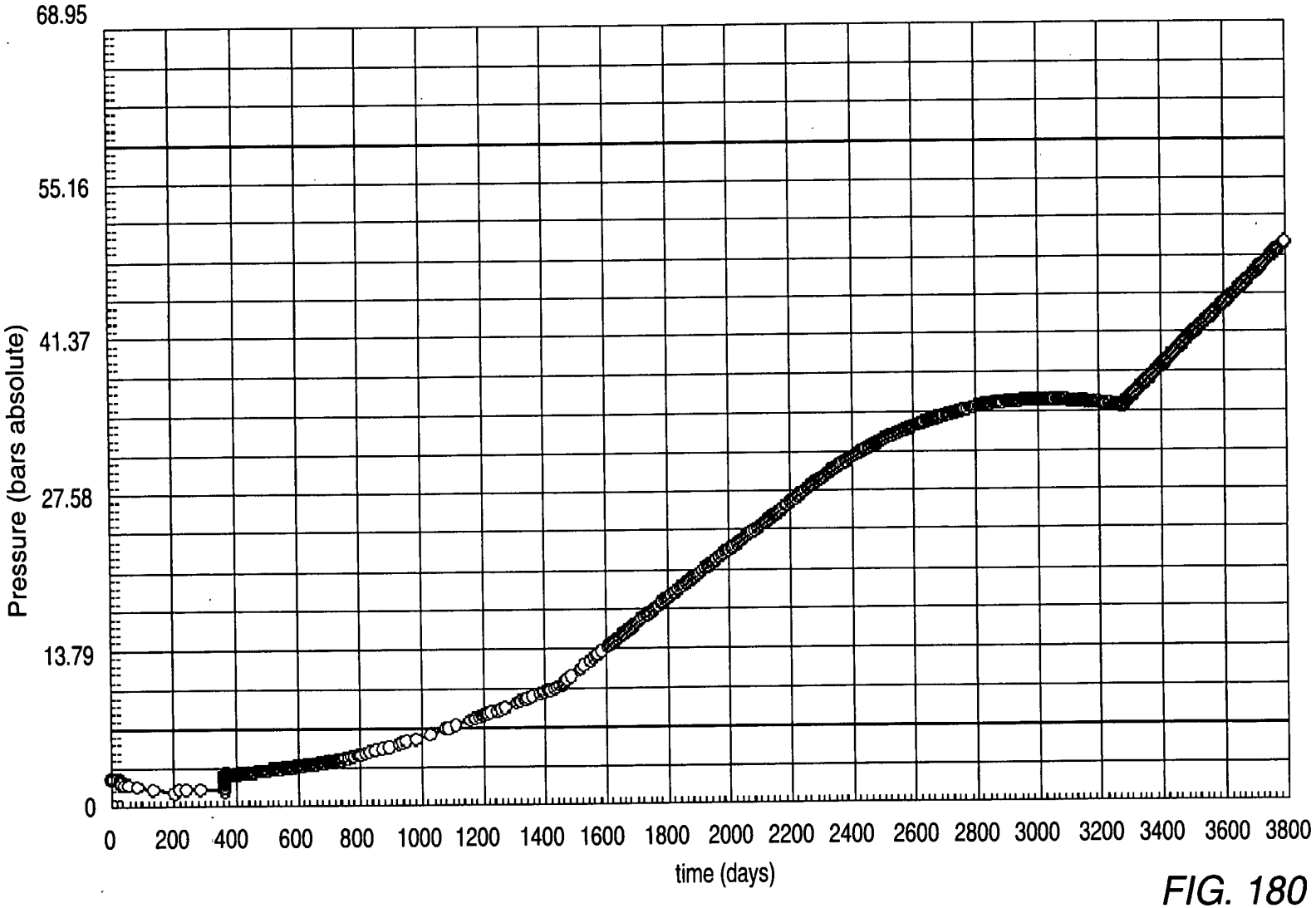

68.95
55.16
41.37
27.58
13.79
0
Pressure (bars absolute)
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800
time (days)

FIG. 180

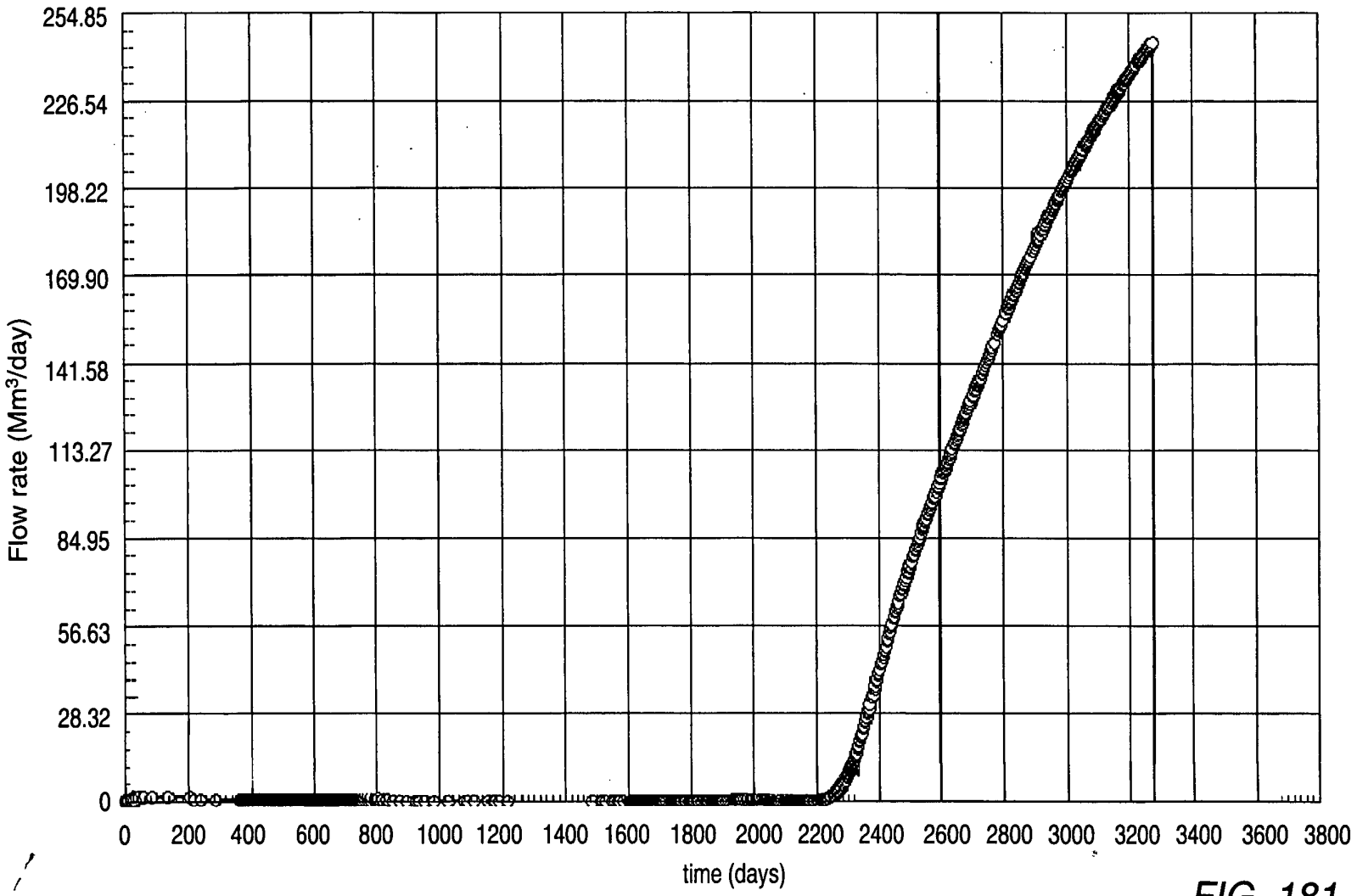

254.85
226.54
198.22
169.90
141.58
113.27
84.95
56.63
28.32
0
Flow rate (Mm³/day)
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800
time (days)

FIG. 181

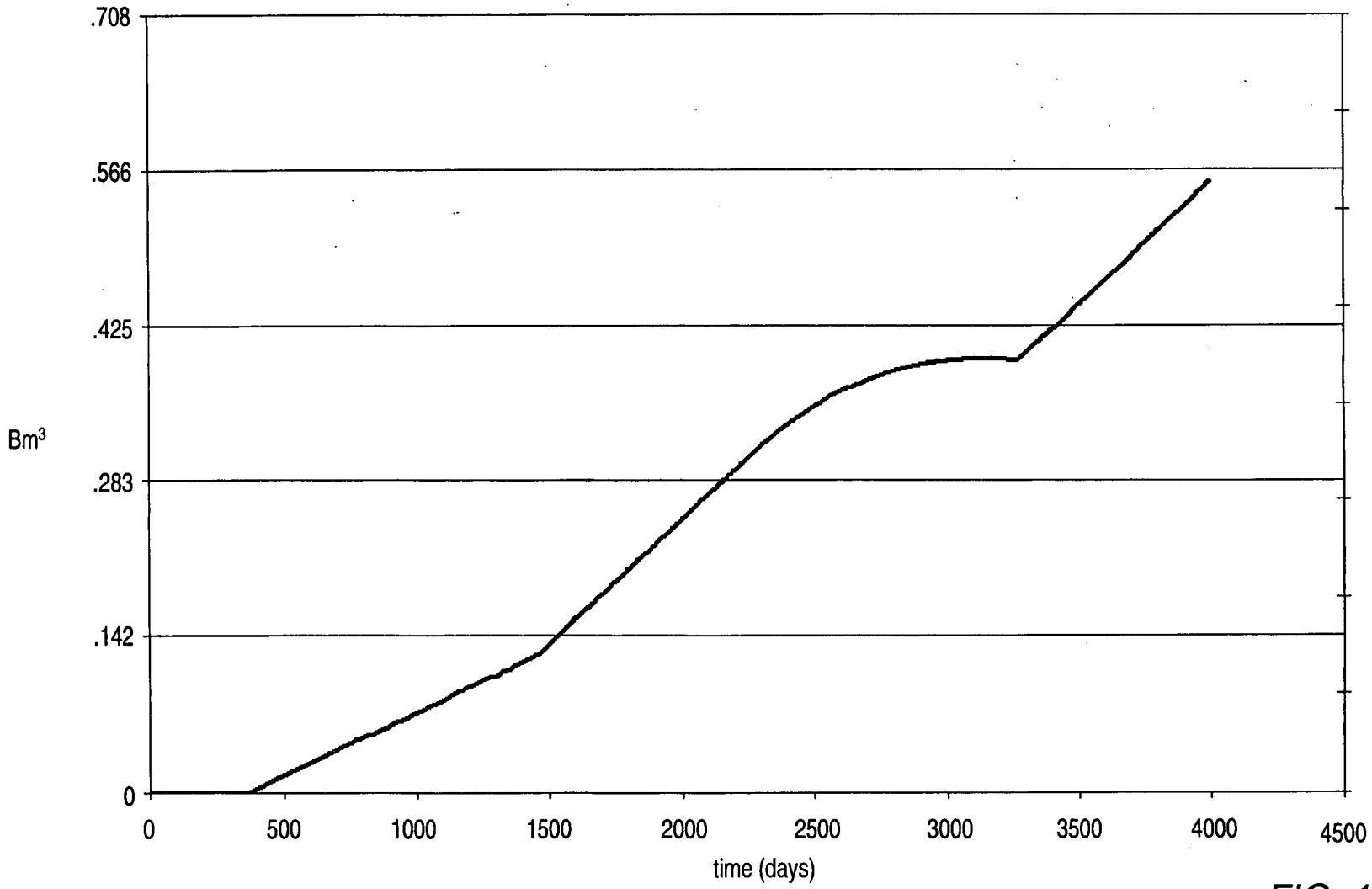

.708
.566
.425
.283
.142
0
Bm3
0
500
1000
1500
2000
2500
3000
3500
4000
4500
time (days)

FIG. 182